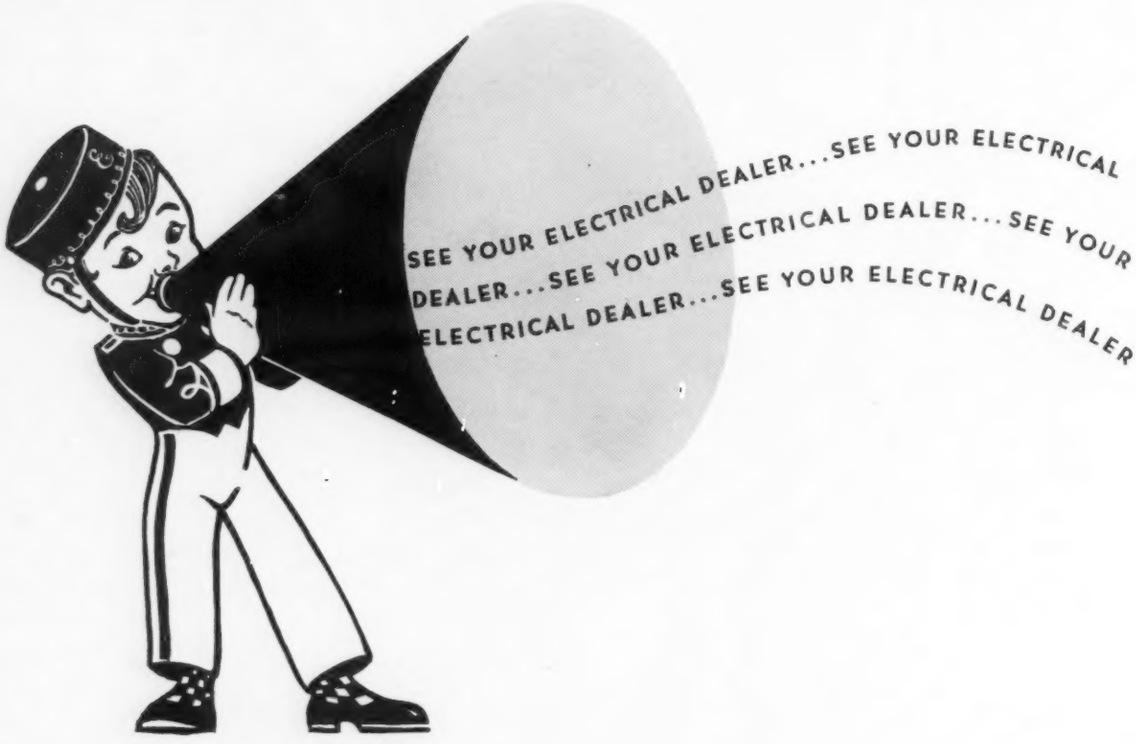
ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

EPT. 1938
PRICE 25c
McGraw-Hill Co. of Calif.

Widening the Appliance Market


SEE YOUR ELECTRICAL DEALER...SEE YOUR ELECTRICAL
DEALER...SEE YOUR ELECTRICAL DEALER...SEE YOUR
ELECTRICAL DEALER...SEE YOUR ELECTRICAL DEALER

Advertising Where and When It Will Do The Most Good . . . Edison advertising is both timely and versatile. Ranges, refrigerators, innumerable smaller appliances, equipment for the home, factory, farm, and oil fields—all are constantly kept before the people in Edison territory by advertisements in 250 newspapers and periodicals, by radio, and direct mail literature. Sixty million times a year Edison says, "see your electrical dealer" for greater comfort, convenience and happiness through electric servants.

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

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The All-Industry Magazine of Progress

ELECTRICAL WEST

MEMBER AUDIT BUREAU OF CIRCULATIONS

ESTABLISHED 1887 AND INCORPORATING THE "ELECTRICAL JOURNAL," "JOURNAL OF ELECTRICITY, POWER & GAS" AND "JOURNAL OF ELECTRICITY"

ABP

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883 Mission Street, San Francisco

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CONTENTS FOR SEPTEMBER, 1938—VOL. 81, NO. 3

Electra's Husband 21

Whither the Public Utility?.....Paul M. Downing 22

Bonneville Power for Northwest Industry....Walter W. R. May 25

Water Power + Mineral Riches = A Future..Dr. Edwin T. Hodge 28

Sales Parade 30

Appliance Sales Guide — Home Lighting..... 33

Maintenance
Streamlined Motor Repair..... 39

Engineering
New Capacity for Montana.....H. H. Cochrane 40
Water Rheostat Is Test Load for Bonneville.....
.....Richard LaHue Earnheart 42
AIEE Attracts 450 to Portland Meeting..... 45
Not Plotted 46

Lighting & Wiring
Engineering Plans 47
Portland Code 48

Rural Loadbuilding 50

Editorial 52

News of the Industry..... 54

Where to Buy in the West..... 66

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VITAL STATISTICS

PROBABLY not one business man in a 100 fails to see the necessity for better public relations between his company and his employees, his customers and prospects, his community. Here in the West, where business is progressive, the ratio widens to perhaps one in 200. And in the electrical industry, the most progressive of all businesses, the ratio is still wider. We all know our industry is bucking a problem. But, generally speaking, we're not sure quite what to do about it.

That's why ELECTRICAL WEST is going to lend a hand. Next month we're launching a dramatic and continuous editorial crusade to sell the need of action; to offer practical suggestions on activities; to develop and broadcast facts for you to use with employees and the public; to exchange successful practices.

Watch for it. We guarantee that you'll benefit.

Last month we asked how many of our present subscribers were subscribers before the San Francisco fire of 1906. We've received a good many answers. Lots of Western electrical men have found ELECTRICAL WEST vital to their business success. Three men, for instance, have been subscribers since before 1900. They are:

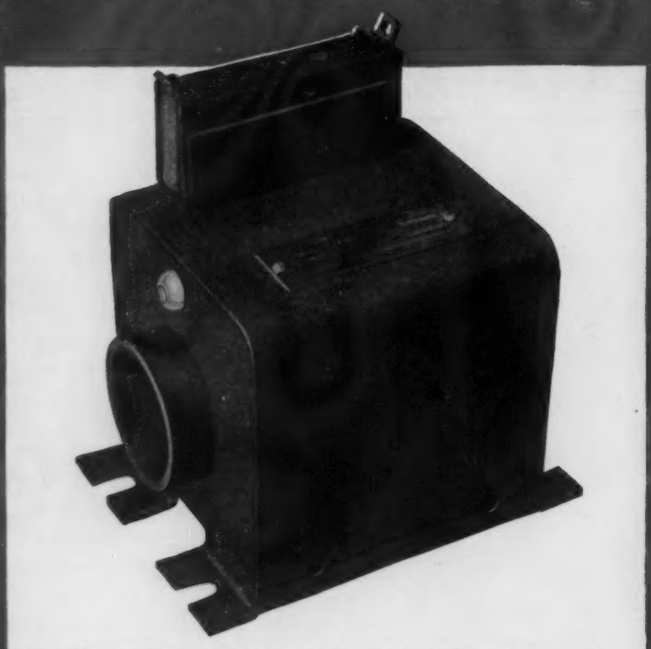
Samuel H. Taylor, now retired, who subscribed for and advertised in the "Pacific Coast Lumberman, Contractor and Electrician" in 1888. John B. Fisken, Washington Water Power's safety engineer, who subscribed to the "Electrical Journal" in 1895 and has recently presented his complete, up-to-date file of the magazines to the engineering library of the University of Idaho, where his two grandsons are studying electrical engineering. And Carl Heise of Westinghouse, who subscribed to the "Journal of Electricity" in 1898.

Are there any present subscribers who can beat these records? Are there any more men who qualify as prior-to-fire subscribers?

And if it's extra valuable information you want, turn to the new Product Data column on Page 66.

Stock FEWER
Change FEWER

WIDE RANGE ACCURACY ON OVERCURRENTS SIMPLIFIES STOCKING AND REPLACEMENT PROBLEMS



WESTINGHOUSE FW—THROUGH TYPE CURRENT TRANSFORMERS—Compact, low cost, simple to install. Two ratings cover primary current range from 20 to 1200 amperes. No primary connections. Small size saves space in metering boxes.

4 WESTINGHOUSE ADVANTAGES THAT GIVE NEW LOW COST METERING

1 COMPLETELY COORDINATED INSULATION. Surge protection of all transformers coordinated with rest of system.

2 NEW HIGH-ACCURACY CURRENT TRANSFORMER (FW) Meter from 20 to 1200 amps. with only TWO transformers.

3 NEW POTENTIAL TRANSFORMERS (PT, PTO) Designed to withstand surges and overloads.

4 QUICK-CHANGE CONSTRUCTION of base and terminals simplifies current transformer changes to meet varying loads.

with

WESTINGHOUSE INSTRUMENT TRANSFORMERS

Metering up to 1200 amperes with only *two* transformers would until recently have been impossible.

Today, thanks to the high accuracy over a wide range of currents that can be obtained only in the new Westinghouse Current Transformers (Type FW) it is both possible and practical.

The new Westinghouse FW Current Transformer combines the low cost, easy-installation advantages of through-type construction with a metering accuracy within 3/10 per cent, over a range of 10% to 200% of rating. Only two transformers—200/5 and 600/5 amperes—permit accurate metering of an entire primary current range of from 20 to 1200 amperes.

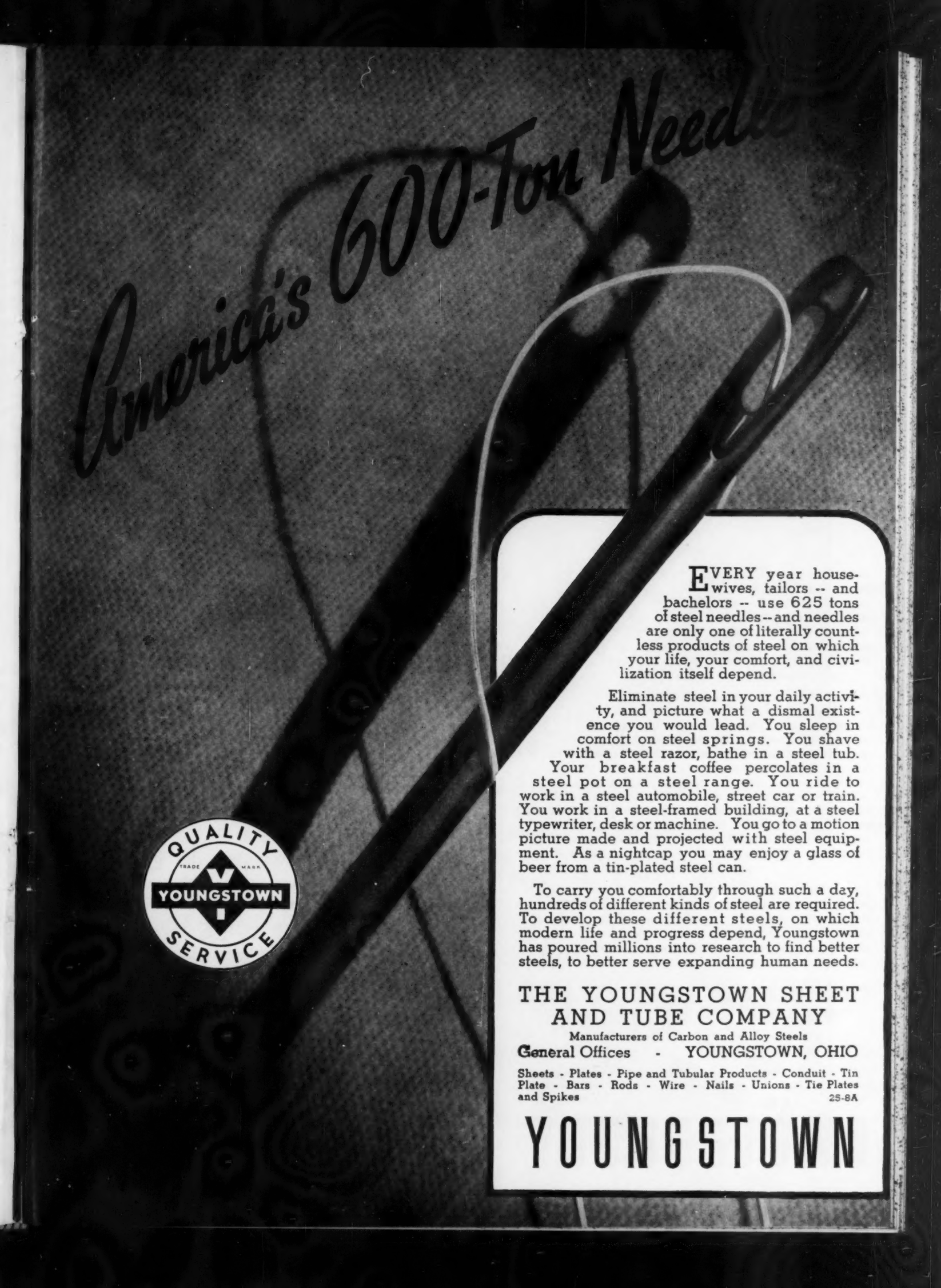
Such wide range accuracy means important savings for you both in the reduced variety of transformers needed for stock, and in the fewer changes needed to meet increasing or fluctuating loads. Ask your Westinghouse representative for full information or send for booklet illustrated below.

Send for this new booklet (B. 2138) describing the Westinghouse line of coordinated Instrument Transformers. Address Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Pa.

Westinghouse
INSTRUMENT TRANSFORMERS

Coordinated to stay in Service

WESTINGHOUSE ELECTRIC



QUALITY
TRADE MARK
YOUNGSTOWN
SERVICE

EVERY year housewives, tailors -- and bachelors -- use 625 tons of steel needles -- and needles are only one of literally countless products of steel on which your life, your comfort, and civilization itself depend.

Eliminate steel in your daily activity, and picture what a dismal existence you would lead. You sleep in comfort on steel springs. You shave with a steel razor, bathe in a steel tub. Your breakfast coffee percolates in a steel pot on a steel range. You ride to work in a steel automobile, street car or train. You work in a steel-framed building, at a steel typewriter, desk or machine. You go to a motion picture made and projected with steel equipment. As a nightcap you may enjoy a glass of beer from a tin-plated steel can.

To carry you comfortably through such a day, hundreds of different kinds of steel are required. To develop these different steels, on which modern life and progress depend, Youngstown has poured millions into research to find better steels, to better serve expanding human needs.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate - Bars - Rods - Wire - Nails - Unions - Tie Plates and Spikes

25-8A

YOUNGSTOWN

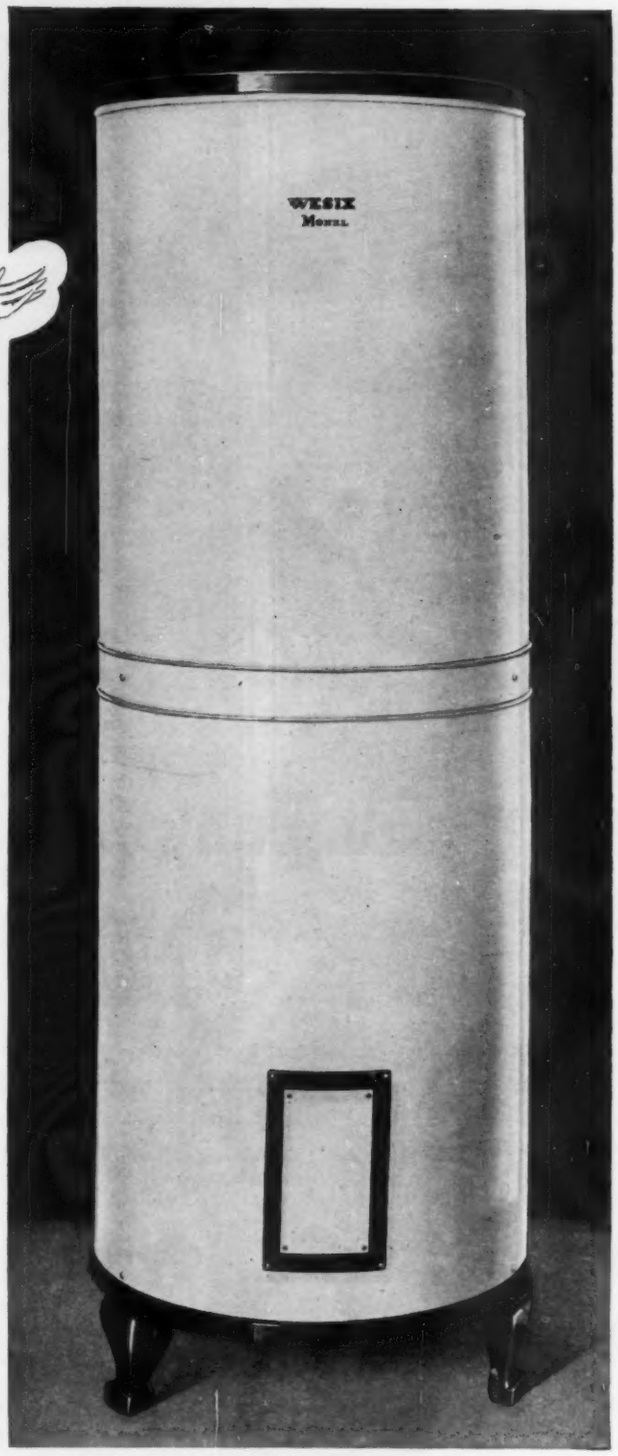
GRAYBAR takes pride in the completeness of its service of electrical supplies—a service to the whole community. Every electrical need of industry, office, and home can be filled from Graybar's list of 60,000 electrical items.

At the same time, nearby Graybar warehouses make these electrical products quickly and conveniently available...when and where you want them. And Graybar's 69 year reputation for quality assures dependability in every electrical product.

Finally, Graybar's service of distribution saves buyers' energies and time...makes heavy reserve stocks unnecessary...coordinates delivery and assembly of stocks. Call on Graybar ...for *everything electrical!*

OFFICES IN 85 PRINCIPAL CITIES EXECUTIVE OFFICES: GRAYBAR BLDG., NEW YORK

WESIX *goes* MONEL



The Wesix Electric Water Heater with solid Monel tank. Manufactured by Wesix Electric Heater Company, 390 First Street, San Francisco, California.

Adoption of solid Monel tanks for Wesix Electric Water Heaters promises record breaking sales

YOU'VE got to hand it to Wesix. They couldn't improve the heater, so they put in a better tank. And what a tank! Made of solid Monel, it *cannot* rust . . . and it's plenty tough and strong.

What a boost for Wesix Heaters! And what a boost for *you*. For solid Monel tanks offer two big merchandising advantages:

1. **Better value for the customer in terms of long life and clean, rust free hot water. The Monel tank is guaranteed against failure or leaks due to rust or corrosion for 20 years.**

2. **Greater sales possibilities for you because of Monel's nation-wide popularity.**

Monel's freedom from rust, ability to withstand hard knocks, and lasting beauty have made this durable Nickel alloy the popular household metal. And Monel National Advertising, reaching more than 10,000,000 readers month after month, has made the name "Monel" a familiar household word.

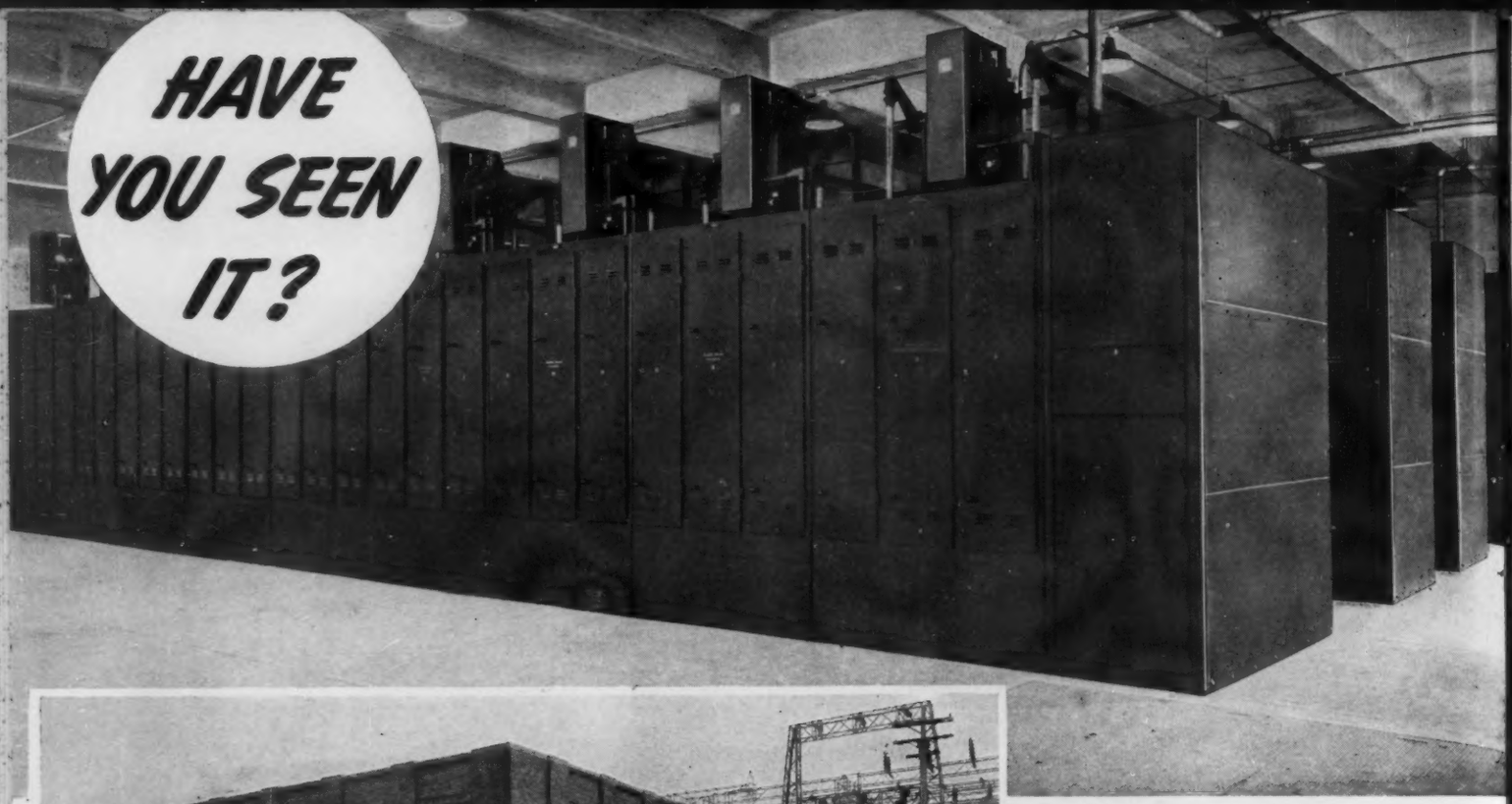
Wesix Electric Water Heaters with solid Monel tanks are available in 30, 40, 50, 60, 100 and 120 gallon capacities. Write to Wesix for full particulars. Ask how they can help you merchandise this Monel-equipped, money-making heater.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET, NEW YORK, N. Y.

• • •

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

HAVE YOU SEEN IT?



Grant Street Substation, Cleveland Electric Illuminating Company

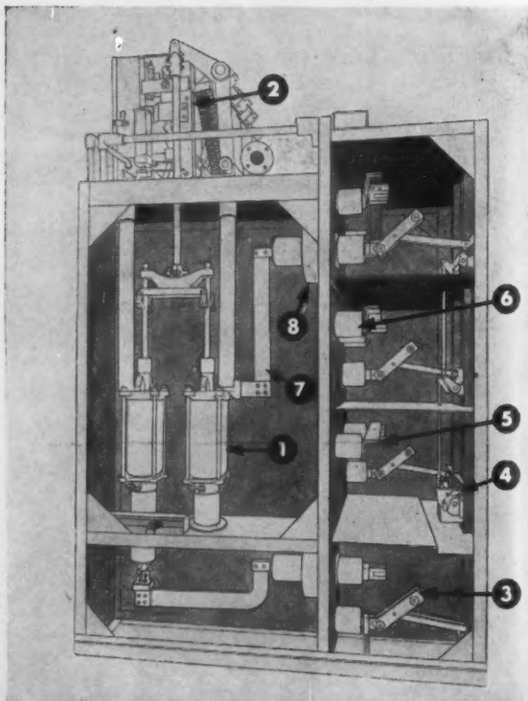
The Largest Power Company Installation of FH Cubicles

The proved safeguard of service to customers

A major aid to actual economy in station design

FH cubicles are completely factory-assembled. A self-supporting housing of STEEL eliminates the perplexing problem of masonry construction. No live parts are exposed, and the breakers, disconnecting switches, and doors are all completely interlocked. An FH cubicle is a lot more than just a breaker. Here's what you get:

1. Modern Type FH oil-blast circuit breaker
2. High-speed trip-free breaker-operating mechanism
3. Six group-operated isolating disconnecting switches
4. Mechanical interlocks for breaker, switches, and doors, assure correct operation
5. Heavy-duty structural-shaped buses
6. Heavy-duty bus supports
7. All copper interconnections have silver-to-silver current-exchange surfaces
8. Necessary current transformers



Send for detailed description. General Electric Co., Schenectady, N. Y.

GENERAL ELECTRIC

890-46

HERE'S A "GOLDEN HARVEST" FOR YOU, MR. DEALER!

You'll want to share in this bumper crop of profits. Silex now offers an exciting new line of Glass Coffee Makers . . . New, exclusive features . . . A Fall program so thorough and far-reaching, you can reap a "Golden Harvest"!

Remember—Silex is America's depression-proof line! Silex has always dominated the field. Now, with an intensive advertising drive in 53 rotogravure sections, 16 leading magazines and 68 newspapers reaching 52,648,861 homes, Silex will continue to be your biggest profit line. Order today one or both of the Silex deals . . . according to your needs. See your jobber's salesman or write us for further details regarding the "Golden Harvest".

Added Exclusive Features to keep the "weeds" out of your market

No other coffee maker offers you so many important features . . . features that insure enthusiastic acceptance among all your customers.

1. New Graceful Upper Bowl Handle. Unnecessary to touch hot upper bowl.
2. New models . . . redesigned, more graceful, more beautiful.
3. The Famous Anyheet Control . . . standard on all electric models $5.95 and up. Keeps coffee any heat at a turn of the dial.
4. "Quick Cooling" Stoves . . . automatically time infusion period, brewing completed without removing glass from stove.
5. Patented Silex filter that insures clean coffee free of all sediment.
6. Pyrex Brand Glass.

TWO DEALS . . . wide assortment in each

To enable you to cash in on sales from every type of prospect we are offering two deals. To capitalize thoroughly on the display value and customer appeal of the new Silex line, order both deals. They give you the widest possible assortment of new models. If both deals offer too great an assortment, one or the other deal may be purchased; then supplement either deal you buy with the extra models you need to meet your demands.

GOLDEN HARVEST ASSORTMENT NO. 2

8-cup Delray electric table model, red **$5.25**

12-cup Lido Clear electric table model, black **$6.95**

8-cup Pinehurst electric table model, **$6.95**

8-cup Lido Decorated electric table model, **$9.95**

4-cup Flamingo "Sterno canned heat" model, red **$5.95**

GOLDEN HARVEST ASSORTMENT NO. 1

8-cup electric Delray, black **$4.95**

10-cup Kitchen Range Model, black **$3.45**

8-cup Anyheet Delray, red **$6.25**

8-cup Pinehurst electric **$6.95**

With the units in deal No. 1 you can make up a large assortment of 8 models; with those in deal No. 2, a wide assortment of 9 models.

$5,040.00 WINDOW DISPLAY CONTEST

Still another big "Golden Harvest" opportunity for you to reap extra profits in your own "back yard"! For the best windows featuring Silex Glass Coffee Makers during this big nation-wide drive, we are giving $5,040.00 in cash! Six first prizes, $250 each; 6 second prizes, $50 each; fifty third prizes, $10 each. See your jobber today for full details of contest.

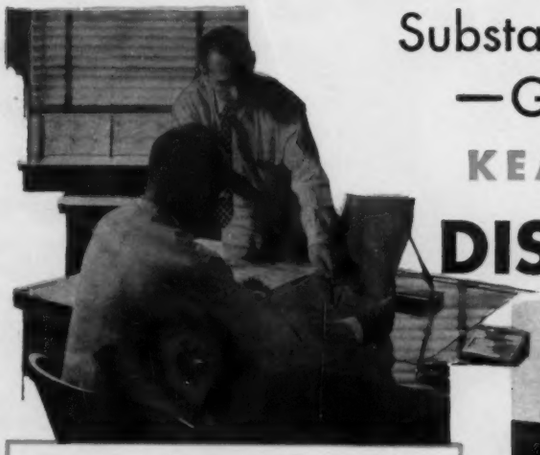
THERE IS ONLY ONE

Genuine SILEX GLASS COFFEE MAKER

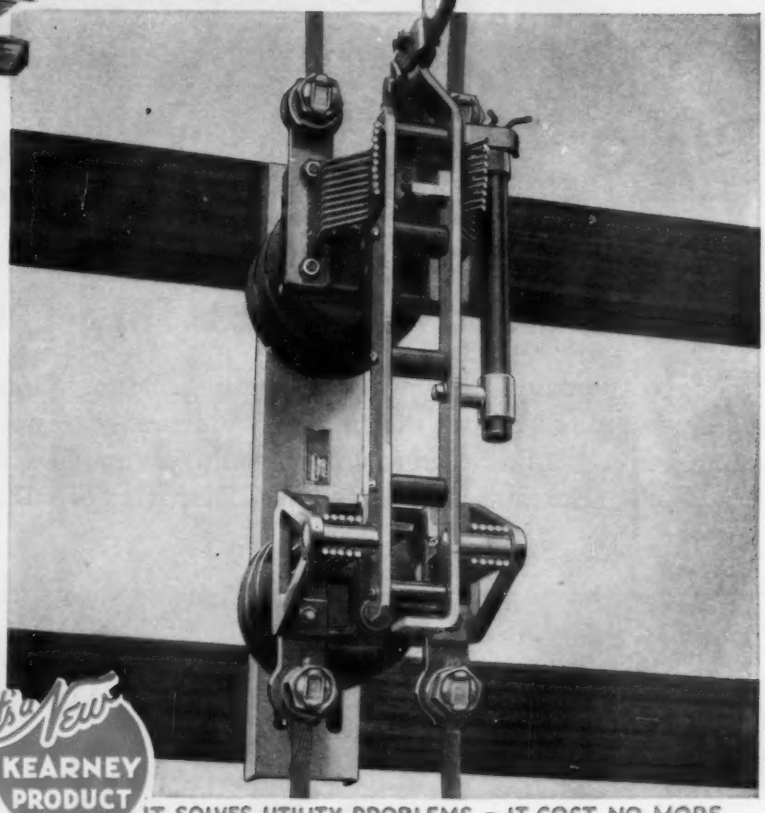
TRADE MARK REGISTERED U. S. PAT. OFF.

THE SILEX COMPANY, DEPT. EW, HARTFORD, CONN.

OKONITE & MANSON TAPES
OKONITE TAPE
THE OKONITE CO.
A RUBBER TAPE AS GOOD AS THE FAMOUS OKONITE INSULATION ITSELF
A FRICTION TAPE BY WHICH ALL OTHER TAPES ARE JUDGED
THIS BOX CONTAINS 1/2 POUND 3/4 INCH BLACK
Manson Tape
MANUFACTURED SOLELY BY THE OKONITE CO. PASSAIC
THE OKONITE COMPANY
Founded 1878
HAZARD INSULATED WIRE WORKS DIVISION
THE OKONITE-CALLENDER CABLE COMPANY, INC.
EXECUTIVE OFFICE: PASSAIC, N. J.
New York Boston Chicago Detroit Philadelphia
Pittsburgh Washington San Francisco Los Angeles
Seattle Buffalo St. Louis Dallas Atlanta
Factories: Passaic, N. J. Wilkes-Barre, Pa. Paterson, N. J.



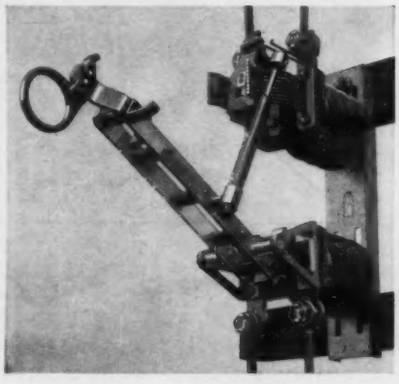
Substation Costs Should be Reduced —Good Reason To Specify New KEARNEY BY-PASS DISCONNECT SWITCH



IT SOLVES UTILITY PROBLEMS - IT COST NO MORE —

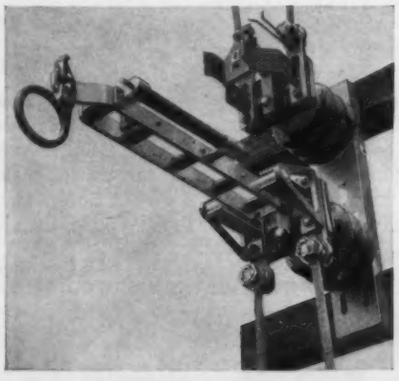
THE 1st ACTION....

The switch operates to by-pass and short-circuit the blades . . . next, blades are withdrawn from the multiple point-pressure contacts—then regulator exciting current is interrupted by auxiliary switch (on side of blade).



And Finally....

After the auxiliary switch has interrupted the regulator exciting current, it returns to normal position, the blades and auxiliary switch opening to 90 degrees, as illustrated in the photograph.



ELIMINATE COSTS of three conventional hook operated switches, and, perhaps, the cost of a manually operated circuit breaker, in connection with voltage regulator installations . . . Use just one (1) Kearney By-Pass Disconnect Switch—conserve space—economize in taking a regulator out of service for inspection or repairs.

Careful research combined with sound engineering design has made it possible to produce this Kearney By-Pass Disconnect Switch, with exclusive features that permit by-passing a regulator, and then disconnecting it—all in a single operation.

This switch is rated 7500-750 volt, 400 ampere . . . a new switch —the result of requests of operating men who learned how they could reduce costs with the smaller Kearney 7500-750 volt, 100 ampere By-Pass Switch.

Effect immediate savings in substation installations and obtain improved operation. Specify Kearney 7500-750 volt, 400 ampere By-Pass Disconnects on your next substation job . . . See why other operating men rely on just one of these switches to do the job of three conventional disconnects. It will pay you to investigate.

Write for Further Information.

Exclusive Sales Representatives

MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES • SAN FRANCISCO • PORTLAND

EXCLUSIVE DISTRIBUTORS
GRAYBAR ELECTRIC CO., Seattle, Portland, Tacoma, Spokane • WESTINGHOUSE ELECTRIC SUPPLY CO., Phoenix • J. R. BRADLEY CO., Reno

Hotpoint OFFERS 1938's BIGGEST DISCOVERY CAMPAIGN

OCTOBER . . NOVEMBER . . DECEMBER

These 3 High-Spots Will Help You Sell a Volume of Electric Ranges This Fall

Hotpoint gives you the outstanding range selling feature of 1938 . . . a popular range model that makes women say "I want that," and a timed selling plan to enable you to tie up with the Modern Kitchen Bureau's Big Fall activity "Discovery Month."

1. SELECT-A-SPEED CALROD

• Fastest, most economical, most durable electric range surface heating unit. Five cooking heats from Ultra-High to Low-Warm. Select-A-Speed Calrod is a full 8% faster than ever, yet the same unit at Low keeps foods hot for hours —or completes, at great saving, the cooking of many dishes. And in between these heats are three other cooking speeds that fry, stew and simmer at lower cost than ever. Calrod effects savings of 20 to 64% in many cooking operations.

2. SHERWOOD MODEL

• A big value, 39-inch Hotpoint built-to-the-floor electric range. Many features: Directional Heat Oven gives control of top and bottom heat with one switch, improves baking and roasting results. Other features are Select-A-Speed Calrod, Standard Calrod, Thrift Cooker, Triple-Coat vitreous enamel finish, Hi-Speed Broiler unit. Semi-direct Lamp, Condiment Set and Electric Timer at slight additional cost.

3. FALSE FACE SALES PLAN

• Here is the Spark Plug for your entire Discovery Campaign Range activity for the months of October, November and December. This comprehensive campaign is designed and timed to help you get electric range orders *this fall*. It is readily adaptable to your local conditions and can be put to work with a minimum of expense. Get your copy of the Plan Book. Ask your distributor or the Hotpoint district representative.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5612 WEST TAYLOR STREET, CHICAGO, ILLINOIS

Hotpoint

OPPORTUNITY FOR PROFIT!

OCTOBER IS DISCOVERY MONTH!

The Modern Kitchen Bureau's dynamic fall campaign will stir up a lively new interest among buyers of electric ranges. Get ready to cash in on this biggest opportunity of 1938.

• Hotpoint is one of the leading range manufacturers sponsoring the Modern Kitchen Bureau's fall activity. The slogan "Discovery Month . . . See for Yourself that Electric Cooking Costs ½ as Much as You Think," will be broadcast throughout the nation during October. Many women in your community will become active prospects. Reap your harvest of range sales this fall. Tie up with Discovery Month by using Hotpoint's Unique False Face Campaign.

YOU HAVE BEEN WAITING FOR A PICKUP IN BUSINESS. IT'S HERE AND THIS HOTPOINT CAMPAIGN WILL HELP YOU GET ORDERS.
FALSE-FACE CAMPAIGN
LET'S TIE IN THIS HOTPOINT FALSE FACE CAMPAIGN WITH THE BIG DISCOVERY MONTH DRIVE. WE CAN SELL A "FLOCK" OF RANGES THIS FALL.
YOU TOO!
SHOULD DISCOVER THE BUSINESS YOU CAN GET WITH THIS PROGRAM
Hotpoint

TIE IN WITH HOTPOINT AND GO PLACES

• Plan now to get your share of profitable range sales. Hotpoint offers you the world's best known, easiest to sell, nationally advertised line of electric ranges, together with a unique plan for action—The False Face Campaign.

The Plan includes novel retail sales stimulators, Newspaper Ads, Folders, Direct Mail, Window Display, Sound Slide Films, X-Ray Visualizer, Posters. Get your copy of this Campaign Plan. It's Free! Ask your Hotpoint Distributor or Hotpoint District Representative.

ELECTRIC RANGES

REFRIGERATORS • ELECTRIC WATER HEATERS • SINKS AND DISHWASHERS • WASHERS AND IRONERS

Announcing

Locklite

Lights When It's Locked and Only When It's Locked

The Maintenance Man knows it's firmly locked when it lights.

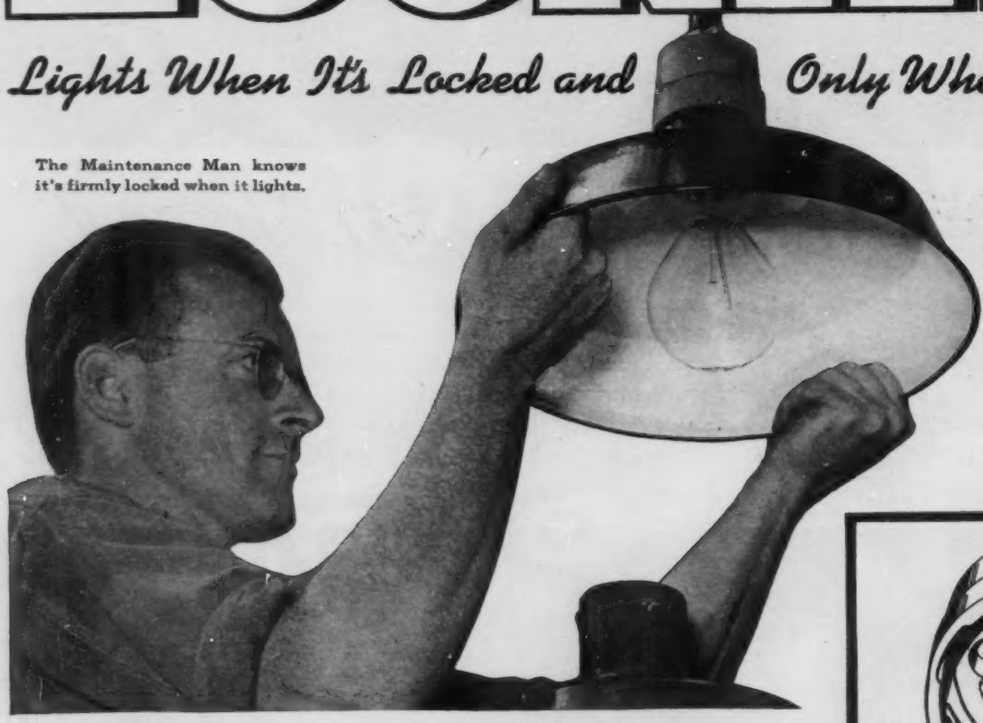
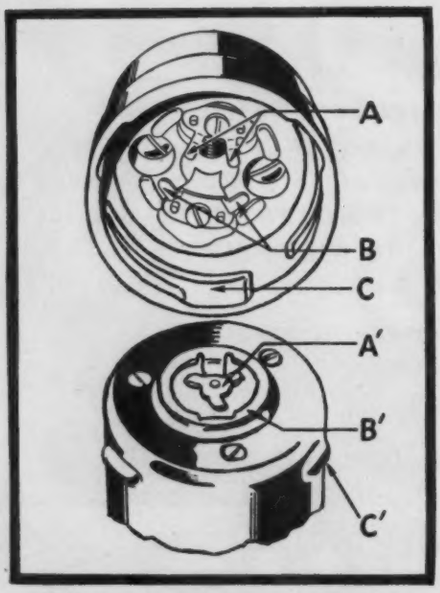


Figure 1 below, shows the new LOCKLITE Hood and Reflector Neck...with electrical contacts designated as A and A¹, B and B¹. Positioning slots in the Hood and corresponding lugs on the Neck of the Reflector are designated C and C¹. The latter are engaged by giving the Reflector an easy turn of 60° clockwise.



AN INGENIOUS NEW PRINCIPLE OF INDUSTRIAL REFLECTOR SUSPENSION

"LOCKLITE" is the Westinghouse name for an exclusive, new electrical and mechanical connecting and disconnecting principle . . . providing an ingenious and entirely different type of industrial reflector suspension.

This principle is embodied in the construction of the RLM Standard Dome, Deep Bowl and Symmetrical Angle Reflectors· also in the Shallow Dome Reflector and Glassteel Diffuser . . . all manufactured by Westinghouse.

Take advantage of LOCKLITE benefits in your own plant...including ease of installation, higher over-all lighting efficiency, greater safety and complete interchangeability of Reflector units.

For "reasons why" call your nearest Westinghouse Jobber and ask to see LOCKLITE features demonstrated at your own desk; or write for further details to Westinghouse Electric & Manufacturing Co., Lighting Division, Edgewater Park, Cleveland, Ohio.

Westinghouse is a member of

RLM STANDARDS INSTITUTE

WHEN YOU THINK OF *Lighting Equipment* THINK OF

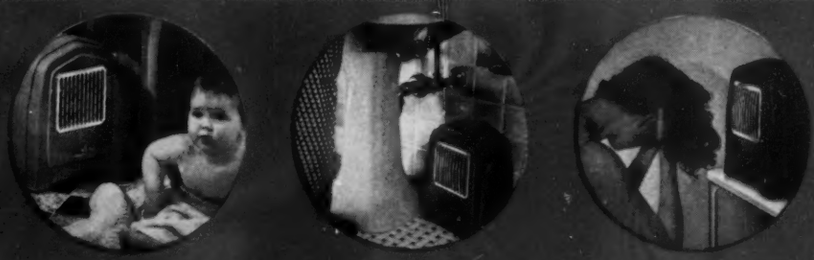
Westinghouse

THEY WARM THE AIR *Completely* CIRCULATING AS THEY HEAT

MODEL 50 JUNIOR $5.95 LIST
Size 7½" high, 7¾" wide, 10½" deep

MODEL 100 STANDARD $7.95 LIST
Size 9½" x 5" base, 11" high

MODEL 200 DELUXE $9.95 LIST
Size 10" x 6¼" base, 13" high

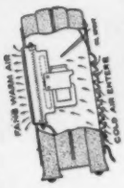


For baby's bath, for shaving or dressing, for drying hair and numerous other personal uses. The ideal heaters for use in city or rural homes—for small offices, stores, ticket booths and hospital rooms—wherever extra or temporary heat is needed.

Attractive Fall & Winter Profit Makers!

Here are the heaters you can sell in volume and at a good profit. Everyone likes the circulating warmth they provide—for hard-to-heat rooms or to drive the early morning chill from bedrooms and bathrooms.

Arvins circulate as they heat, drawing in cold air, heating and circulating it at the rate of 45 cubic feet per minute. Rural electrification, camp cottages and trailers give you a bigger market than ever before for these efficient and economical heaters. Cash in on it . . . Order from your jobber.



All Arvins have induction type motors without brushes, springs or commutators. Fans, heating units and motors are fully enclosed—making the heaters perfectly safe. Heavy gauge steel cabinets in green enamel morocco finish. Rubber feet that can't scratch. No radio interference.

NOBLITT-SPARKS INDUSTRIES, INC. • COLUMBUS, INDIANA

ARVIN
ELECTRIC
Fan-Forced Circulating
HEATERS

Approved by Good Housekeeping Institute and Underwriters' Laboratories

Good Housekeeping Institute

the insulator your customers would specify

By eliminating the cause of radio interference, rather than striving to decrease the effect, Lapp has built in the Line Post the first truly and permanently radio-free insulator. The single porcelain post, without pin or conductive material between tie-wire and base, makes the charging current so small that corona—the cause of interference—cannot form at rated voltage. For consumer good-will, get your power lines "off the air" with Line Posts.

APP INSULATOR CO. INC

LAPP INSULATORS

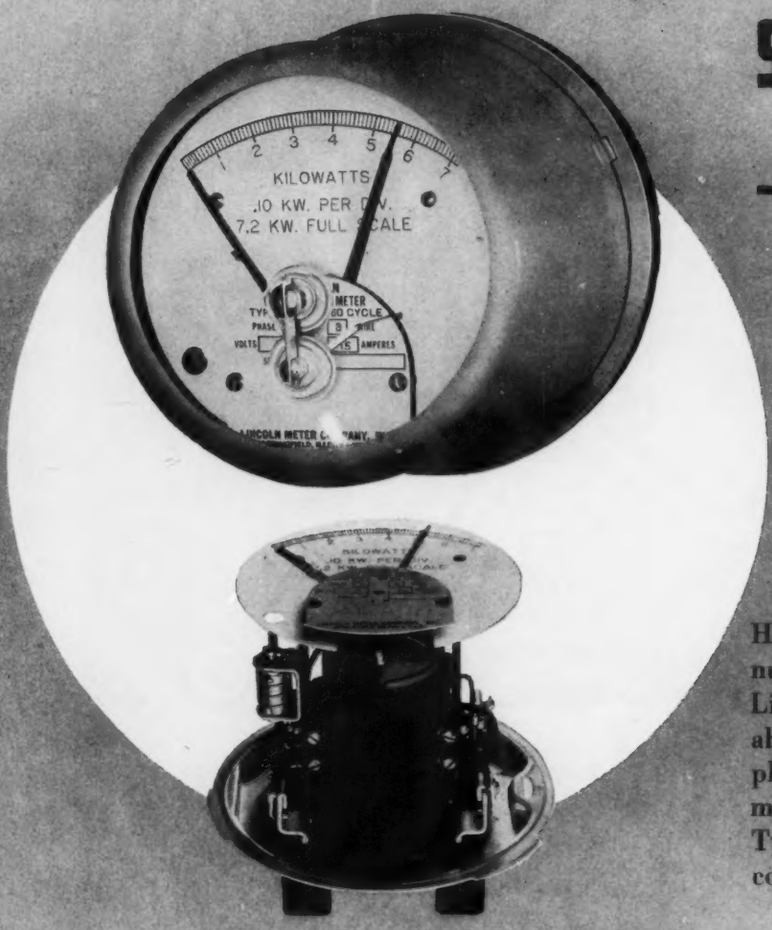
LE ROY - N.Y. - U.S.A.

LINCOLN

MAXIMUM DEMAND METERS

ARE NOW AVAILABLE FOR

SOCKET MOUNTING

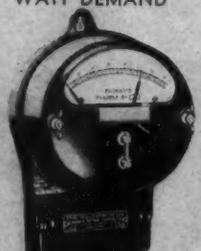


Having performed successfully for 10 years in a number of forms, some of which are shown below, Lincoln Maximum Demand Meters are now available in Type WDS for socket mounting. The complete absence of timing mechanisms and rapidly moving parts assures continued operation of Lincoln Type WDS Meters even under the most extreme conditions encountered in outdoor installations.

APPLICATIONS..

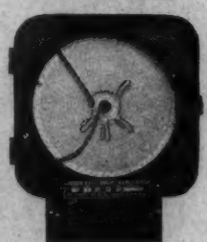
ON WHICH LINCOLN METERS SERVE BETTER

INDICATING WATT DEMAND



Type WD Watt Demand Meters operate independently of the watthour meter.

RECORDING WATT DEMAND

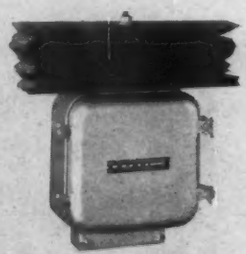


Type CCW Graphic Watt Demand Meters require no contacts for their operation.

INDICATING AMPERE DEMAND

Type AD Meters measure the factor which affects distribution equipment.

RECORDING AMPERE DEMAND



Weatherproof Type CCAO for recording the demand on distribution transformers.

LINCOLN METER COMPANY

SPRINGFIELD, ILLINOIS

SUMMER colonies . . . seasonal camps . . . any peak loads . . . add welcome revenue but create abnormal line conditions on unregulated feeders. Westinghouse Type SU Induction Feeder Voltage Regulators now provide quick, convenient "first aid" for these ailing feeders.

Ready for action at a moment's notice, these new low-cost regulators can be rushed into service wherever abnormal demand makes voltage correction necessary. No need for fancy platforms or special mountings. Just three terminals to connect, and presto—voltage comes promptly up to standard!

Investigate this new first aid for unregulated feeders—ask for prices and full details.

J 10083

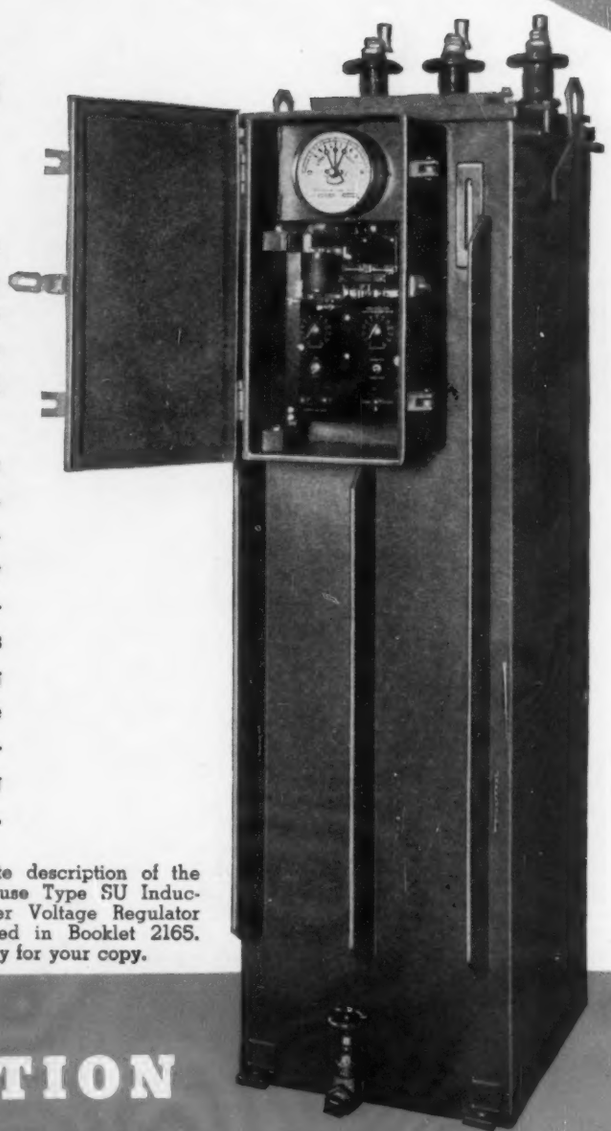
Westinghouse

for abnormal feeder loads

A BETTER Voltage Regulator . . . at LOWER cost!

The lower cost of the Westinghouse SU Induction Regulator now enables you to correct voltage conditions on lines where regulation could not heretofore be justified. These installations will more than pay for themselves through increased revenue, and added customer satisfaction.

The cost of the Type SU Regulator is considerably less than for equivalent regulators of previous designs. Yet the changes which made manufacturing costs less, also made this model more sturdy and more reliable. Operating mechanism is completely oil-immersed and the control equipment is enclosed in a weatherproof cabinet, protecting every part against dust and moisture. Maintenance needs are reduced to little more than an annual inspection. Westinghouse Electric & Manufacturing Company, Dept. 7N, East Pittsburgh, Pennsylvania.



Send for this Booklet

A complete description of the Westinghouse Type SU Induction Feeder Voltage Regulator is contained in Booklet 2165. Write today for your copy.

Type SU INDUCTION FEEDER VOLTAGE REGULATORS

Specify Locke for economy and security

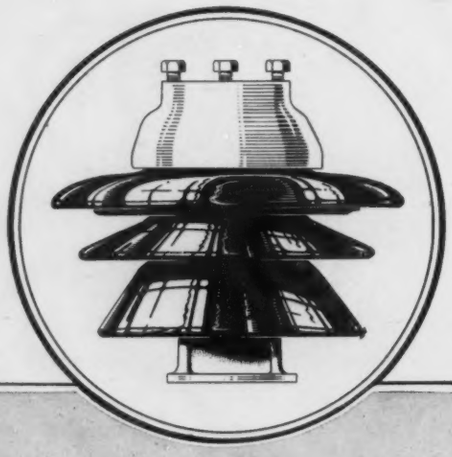
More than fifty per cent of all the switch and bus insulators in use in this country today were designed and manufactured by Locke.

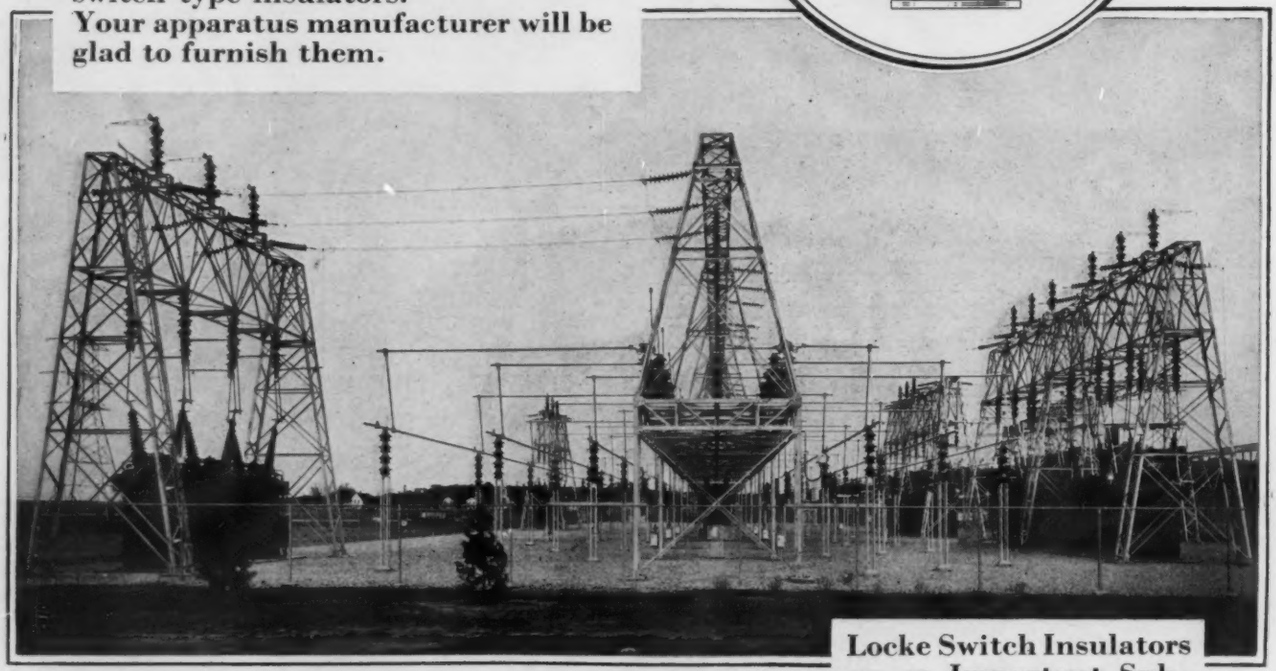
This constant preference which many engineers have expressed is the result of performance.

The excellent service records these scientifically designed, accurately made insulators have established are concrete evidence of the exceptional service they will render you. Their high electrical and mechanical characteristics, their extreme rigidity and ability to withstand abnormal shocks all mean longer life, lower final costs and reduced maintenance expense.

For economy and safety specify Locke switch type insulators.

Your apparatus manufacturer will be glad to furnish them.





Locke Switch Insulators on an Important Substation in Michigan.

Locke COMPRESSION GLAZED

PORCELAIN INSULATORS

LOCKE INSULATOR CORPORATION BALTIMORE, MARYLAND

Forged to Specifications—Coined Two-Step Pins

FORGED by B.T.C.

THROUGH YOUR INSULATOR MANUFACTURER ONLY

IF IT'S HI-LINE HARDWARE, B. T. C. CAN FORGE IT

THE BREWER-TITCHENER CORPORATION, CORTLAND, NEW YORK

FOR LOW-COST CONTROL OF WATER-HEATER LOADS

Presenting a NEW *addition to the* Wide-Limit Family

The IR-30 Combination watthour meter and time switch

Type IR-30-A combination watthour meter and time switch for front connection. The Type IR-30-S for socket mounting is also available

THIS new G-E meter marks another progressive step in the direction of lower-cost control of off-peak loads.

It combines in a single unit the I-30 watthour meter, with its straight-line accuracy between far-apart limits, and an improved Telechron motored time-switch register.

New Lower Costs — Savings in space, savings on installation, maintenance, and inventory investment — these are the advantages of a single unit. Now, add to them the wide-limit accuracy of the I-30 watthour meter, which makes it suited for both large and small single-phase loads, and you can see the way to still lower costs and further protection of revenue.

For any job — Available in all ratings, with any one of three registers — single-dial, with contacts; double-dial with contacts; and double-dial without contacts — the IR-30 meter is suited for any load-control job.

More details — "We've got something" in this new meter, and it will pay you to see what that something is and how it profits you. A G-E meter specialist is ready to tell you all about it, and you can reach him through the nearest G-E sales office or address General Electric Company, Dept. 6—201, Schenectady, N. Y.

GENERAL ELECTRIC

400-32

ELECTRA'S HUSBAND

Ham and Eggs With $30 a Week

WHY is it that as election-time rolls around the number of screwy propositions for the salvation of the human race increases? Just the other night Electra handed me a pamphlet setting forth arguments in favor of one such measure.

"Can we live on $30 a week on that little farm you have been talking about buying?" she asked. "If this proposition gets on the ballot and passes, you can begin thinking about retiring."

The measure she was talking about was an initiative amendment to the California state constitution which was sponsored by the State Retirement and Unemployed Compensation Committee. It proposes to pay $30 a week to all unemployed, $30 a week to all unemployable infirm and $30 a week for life to all over 45 years of age who voluntarily retire from gainful occupation. Anyone who has been a resident of the state one year prior to the passage of the amendment and five years after its passage would be eligible. Payment would be in bonds of the state issued in denominations of a dollar. Each Friday these bonds would have attached to them a 2c bond redemption stamp by whoever held them. At the end of a year $1.04 would have been collected for stamps and the bond would be redeemed at face value for cash.

As I read all this, my mind sought the joker in the proposal. "How many people in the state?" I finally asked Electra.

"Oh, about 8,000,000, I guess," she replied.

"Well, at least half of them would qualify under one of the three groups receiving payment. That would mean the distribution of $120,000,000 in bonds every week. At the end of 52 weeks and for all time thereafter there would be at least $6,240,000,000 of them in circulation. That's just about as much currency as there is outstanding in the whole U. S. Now if that money had to change hands in business transactions every week so as to get a 2c stamp attached, there must be a total annual volume of business and trade of at least $324,480,000,000. For 8,000,000 people that's an average per capita volume of $40,560. And then somebody would have to buy $6,240,000,000 worth of stamps every year in order to redeem the bonds. Electra, it won't work. The guy who proposed this thing didn't figure it out beyond the $30 he himself was going to get each week."

"Isn't that the way with most crackpots?" Electra said in a tone which indicated definitely that the subject was closed.

DAMN the CCC for building roads into all parts of our wilderness country," I said to Electra one day last month as we were headed up over the Sonora Pass highway for one of the many small lakes which nestle beneath the granite Sierra peaks in that section. "Three years ago a fellow could get some real fish out of Rainbow Lake. Now anybody can drive right up to the banks and the fishing is nil."

"Yes, and three years ago it was a five-mile hike into there. If you still had to walk I wouldn't be going along with you," Electra countered. Just then a workman flagged us down with a red flag.

"Blasting up ahead. You'll have to wait a few minutes," he told us. I looked at the stream below the road and wondered whether it was worthwhile setting up a rod to give it a few quick casts. The workman must have read my thoughts.

"There ain't no fish in there," he advised. "Our bunch fished 'em out right after opening day. We been workin' three months on this road. WPA gave the county a big slice of money and a lot of us got jobs. Our county has come out fine. We got a new courthouse, two new postoffices, a lot of fine new roads, some campgrounds and some more I can't remember."

"Isn't that just swell—another example of what makes the public debt skyrocket."

"Oh, no, mister," he interrupted. "These jobs won't affect the public debt at all. You see the government's got that big power house down at Boulder Dam. They're selling that power for plenty of money and then using the cash for all this building. Why when these other government power houses get to working they'll use the money for the electricity to cut down the debt. Pretty soon the government won't owe anything at all. The boss on this job has told us all about it. He says that's why the government built the dams."

The shriek Electra let out sounded for all the world like she had been stung by a hornet. However, she was only laughing. I couldn't laugh. The guy was really serious.

ELECTRA has been counseling a couple of friends on their plans for kitchen modernization jobs. As a result, she comes up with one of her characteristic complaints.

"What's the matter with you people? Don't you think anyone ever eats in the kitchen any more? It looks to me like you are trying to design modern kitchens like a watchmaker—get as much as possible in as little space as you can. People eat in the kitchen—breakfasts, lunches for the kids when they are out of school. Even the maid has to eat. But your kitchen planners don't seem to think so. Make the kitchens step-saving but provide some convenient place for eating once in a while.

"Take your own case. When I'm off visiting and you're cooking for yourself, where do you eat? In the kitchen, of course. You'd rather save steps clearing off the table than cooking your meal, wouldn't you?"

THE human form is divine, when seen in the right light," said the ex-president of the Elysium Nudism Foundation in discussing with exposition officials the possibilities of a museum type of exhibit for the Golden Gate International Exposition. The electrical industry will be glad to help the nudists see things in the right light if given an opportunity.

Whither The Public Utility?

By PAUL M. DOWNING*
Vice-President & General Manager
Pacific Gas and Electric Co.

IT would be a wise man indeed who could speak today on the public utility outlook with any degree of certainty or finality. We are in the throes of a period of economic, social and political readjustment which baffles the forecaster. According to your disposition you may view the future through either dark or rose-tinted glasses.

Let me very briefly recall a few salient facts in connection with the history of the electrical industry. Fifty or more years ago the business of supplying electrical energy to the people was still in the experimental stage. In succeeding years the industry grew with extreme rapidity. It was a promotional and development period. New engineering problems were encountered with every forward step. One company after another was formed to build generating plants and to construct distributing lines. The minds and energies of the leaders were devoted first to financing their enterprises and then to obtaining enough business to pay operating expenses. Most of the systems were small, usually serving only individual cities or communities. As long distance transmission became feasible, the next step was the consolidation of the smaller systems into larger units in order that economies in operation might be realized.

Today, in place of a large number of isolated electric systems, we have modern interconnected networks serving many communities and many different classes of customers. Experience has proved that these systems, with the economies possible under large scale operation, are able to supply better service at lower rates than could possibly be done by the small and less efficient independent plants of a few years ago. Another advantage of even greater importance is the ability of the larger companies to obtain new money at interest rates below those available to smaller companies.

Economies Mean Lower Rates

It might be contended that these advantages are of interest only to stockholders, but as a matter of fact the economies thus effected have been passed along to the users of electricity in the form of reduced rates. All over the U. S. the electric utilities have driven forward despite the retarding influences of depression and recession. Utility managements have availed themselves of the best engineering and technical skill obtainable in their efforts to increase their business, improve service and reduce costs. That they have succeeded is shown by the statement of President C. W. Kellogg of the EEI:

"From the beginning of 1927 to the end of 1937 the electric utility industry expended on construction of its properties about $5,400,000,000 and brought electricity to about 6,870,000 new customers. It reduced the average residence rate by about 2.6 cents a kw.-hr., or 37 per cent. It increased the average annual consumption in the home by 365 kw.-hr., or 85 per cent. In the same period the number of electrified farms was increased by 932,000, or 302 per cent."

In view of this showing, who can truthfully say that the public has not been materially benefited by operation of the utilities under the present system of control and management? These figures show that there is today being used in the homes of the U. S. nearly twice as much electricity as was being used ten years ago, and the cost of this increased usage is one-third less than it was then. During the twenty years from 1917 to 1937 the kw.-hrs. of electric energy generated by the utilities of the U. S. increased more than fourfold. During that same time the residential usage increased twelvefold.

Cheap Electricity Is Here

It is impossible to find in these figures any reasonable justification for the cries set up by the proponents of public ownership that what this country needs most is cheap electricity. The increased use just referred to would not have taken place if rates had been excessive or if the trend of rates had not been constantly downward. We already have cheap electricity, as low in cost as it can be supplied by sound non-political management under present-day costs of labor and material.

Electric rates are regulated not by utility companies themselves but by legally constituted state commissions. But the authority of these public regulatory agencies is not limited to the fixing of rates. It includes supervision of the issuance and sale of securities, methods of accounting, quality of service rendered, kind and type of construction to be used, etc. In brief, it covers practically everything which may have a bearing upon the rates paid by the company's customers. Under this type of regulation the utility has grown to the point where it now represents a total investment in the U. S. of approximately $14,000,000,000.

Although utility managements may not always agree with the mandates of state regulation or the philosophies and conclusions of regulatory bodies, there can be no question but that from the standpoints of both the public and

The government builds Grand Coulee—at a cost of $394,000,000

* Extracts from a paper before the annual business conference, Graduate School of Business Administration, Stanford University, July 21, 1938.

the utilities it has been demonstrated that public regulation of utilities is a successful and desirable form of supervision. Nor can there be any question but that the industry has under this type of regulation and supervision made a record of business achievement seldom if ever equalled in the history of industrial development in the U. S.

But today we find the theory and practice of state regulation under attack by the advocates of public ownership who would have the public believe that under private ownership the utility business operates at the expense of many for the benefit of a few; that bigness is synonymous with badness; that political management is more efficient than private; that public regulation has failed, and that the only way to obtain lower rates is through public ownership.

Facts to Be Digested

An examination of the conditions surrounding the operations of privately and publicly owned plants reveals a number of interesting facts: Publicly owned utilities are not subject to state regulation. They pay no taxes. They are free to fix rates in any manner they may choose. They may employ any method of accounting that they see fit to adopt, and those methods are not standardized as are the accounting systems of the privately owned companies. Too frequently the accounting is handled in such manner that important facts with respect to their operations are hidden behind an impenetrable fog of bookkeeping concealment. Despite the fact that the published rate schedules of publicly owned utilities are frequently lower than those of companies privately owned, customers can never be assured that those advantages are not obtained at the expense of the taxpayers.

Public ownership does not like state regulation. It does not want to be forced to comply with the same rules of conduct which govern the privately owned utilities. It demands that it be granted immunity and complete freedom to wage its fight against a mythical "power trust" without the hampering restrictions set up by laws which should, but do not, apply equally to all utilities whether privately or publicly owned. Legislation which would place municipally and publicly owned utility operations under the same regulations as those imposed upon the privately owned companies would be in the public interest. The intricate problems involved in the operation of large electric systems are at best confusing and difficult for the layman to understand. If identical standards were made applicable to all distributors of electric power, the taxpayer would be able to obtain authentic information from which to draw his own conclusions as to the relative merit of private vs. public ownership.

During recent years there has developed a new and more ruthless form of competition in the utility business. I refer to competition by the U. S. Government, either direct or by subsidy or outright grant. A governmental activity of this kind is a matter of grave importance to the people of this nation, because in the end they must pay the bill for whatever losses are incurred. It goes further than the potential loss of income by the 10,000,000 shareholders in American electric utility companies and the owners of the bonds of those corporations. It goes to the fundamental question of how far should the Federal Government depart from the purpose for which it was founded, namely, to provide for the people those services which they cannot properly perform for themselves. By no stretch of the imagination can it be said that the production and distribution of electric power should be so classified.

Headlined Attacks

But government aggression against utilities is not restricted to the financing and construction of competing systems. The chorus of official criticism, threats and unwarranted attacks have become familiar features of the news reports emanating from Washington.

Some idea of the extent to which government competition has gone may be had by referring to a few of the projects now under construction. Some of these are:

	Estimated Cost
Tennessee Valley Authority	$520,600,000
Bonneville Project (Ore.)	74,144,000
Grand Coulee Project (Wash.)	394,000,000
Boulder Dam (Ariz.-Nev.)	165,000,000
Central Valley Project (Calif.)	170,000,000
Casper Alcova Project (Wyo.)	22,700,000
Fort Peck Project (Mont.)	108,500,000
Colorado-Big Thompson and Bluestone Project	57,000,000
Various REA Projects	79,789,000

To this staggering total of almost $1,600,000,000 must be added countless other hundreds of millions of dollars to provide transmission and distribution facilities for marketing the energy output of these projects. On top of all this come PWA grants and loans to state and municipal projects which up to February 1938 amounted to approximately $150,000,000.

Attempts have been made to justify some of these projects on the ground that their primary purposes are water conservation, flood control, land reclamation, prevention of soil erosion, improvement of navigation and other purposes, with power mentioned as an incidental byproduct. The argument is advanced that water impounded behind dams and in large storage reservoirs represents potential power which for economic reasons should be used to generate electricity and thus produce some income from an otherwise unproductive project. Such an argument is persuasive, but there is every reason to believe that in many of these projects the electric tail will be wagging the dog in spite of all that has been said to the contrary.

When it comes to determining what part of the total cost of projects such as those referred to should properly be charged to the development of electric power, one finds himself lost in a maze of conflicting theories. The important question here is: If the Federal Government is going to compete with the strictly regulated privately owned utility companies should it do so on a fair and equitable basis, or will it by sleight-of-hand bookkeeping continue to subsidize the publicly owned enterprises from tax funds and thus take advantage of a situation which, if carried to its logical end, will go a long way toward destroying private ownership of electric utilities?

One of the strong arguments advanced in favor of establishing the TVA was that it would serve as a yardstick in determining the cost of power and set up standards for the guidance of the entire country in fixing rates to be charged for electric service. As an emotional appeal the idea doubtless has considerable merit. But unfortunately this yardstick has proved to be an extremely elastic one capable of being stretched or contracted at the will of the user.

The Great Enigma

Due in part at least to the elasticity of this measuring device, no one has yet been able to obtain either from TVA reports or elsewhere any dependable information as to the cost of producing and transmitting the electric energy it is selling throughout its territory. The highly publicized "low rates" at which power is being sold are wholly arbitrary and fixed by the directors of the project without regard to investment or cost of government operation. In the meantime, the question of allocation of costs of this and other similar projects continues to be a subject of dispute. In the act which created TVA the ostensible purpose was the improvement of navigation, flood control, redemption of marginal lands, development of agriculture and industry and provision for national defense by operation of the government war-time nitrate plant at Wilson Dam. Although no mention of electric power was made in this recital of objectives, one-third of the text of the act was devoted to the subject of electrical development.

The entire project was to be a great experiment in social and economic engineering.

Hydroelectric power was to be simply an inevitable byproduct. History has not made good this expectation. Since almost the beginning of its operation TVA has been engaged in a process of writing down capital costs in an attempt to justify the low electric rates it has established. Its reports of total investment have varied widely in amounts and its allocation of costs chargeable to power development has been repeatedly changed. For instance, in the TVA annual report for the fiscal year ending June 30, 1937, the net investment in electric facilities is stated as $10,945,061. This low figure would indicate that the total costs of dam, power houses and generating equipment was charged to navigation and flood control, leaving the cost of transmission lines as the only charge to electric investment. In June 1938, in response to a demand from Congress, the TVA increased the charges against electric investment to $49,360,179 and submitted a new set of figures for total investment in three completed dams which they arrived at by writing off $23,000,000 of original cost. This latest report shows that 48 per cent of the total cost is now allocated to navigation and flood control and 52 per cent to electric investment. Concerning this, one New York newspaper states, "Several things about these figures are odd. To begin with, they bear no direct relation to actual cost of the enterprise. The total valuation placed on these dams may not account for more than one-third, if it amounts to that much, of what the government has spent to date in the area they affect including the original investment in Muscle Shoals."

Even Dr. Morgan Said—

Shortly after his removal as chairman of the TVA, Dr. Arthur E. Morgan said before the Municipal Utility Ass'n. of New York State: "True and representative accounting, while essential to all phases of the public business, is especially necessary in the public power field where comparisons will be made between different public systems and between public and private industries. Good government and good business cannot tolerate hidden costs or manipulation of accounts for misleading publicity."

These facts appear to give strong support to a conclusion reached by an independent investigator of this government enterprise, published a few months ago, that based on present operations TVA is suffering a loss of $30.80 per year for each customer it is serving and that U. S. taxpayers are paying 40 per cent of the cost of service in TVA territory.

When we examine the Bonneville project in Oregon, we find the same confusion over cost allocation and the same disagreement as to the true purposes of the enterprise. Again we have the government establishing a yardstick for electric power costs having no relation to the actual investment involved. To an impartial observer it might well appear that the entire cost of Bonneville, with the possible exception of the navigation locks, should be charged to power.

Unmeetable Competition

Many other instances of improper cost allocation might be cited. Those mentioned are sufficient to indicate that the present tendency is to decide each individual case as the exigencies of the situation appear to require. The net results of this practice will be a form of competition which the privately owned companies will find extremely difficult to meet.

The Central Valley project recently started in California by the U. S. Bureau of Reclamation falls in the same category. Its primary purposes are water conservation and flood control, with power more definitely a byproduct than it is in many other similar projects. A very substantial amount of power will be developed, much more in fact than can be absorbed in the immediate vicinity of Shasta Dam. What disposition will be made of it has not yet been announced. The entire territory in which it will be available is already adequately served. Duplication of existing facilities cannot be justified. A more logical and economical way to market it would be through the existing facilities of the present supplying utility. The company I represent has on numerous occasions announced its willingness to purchase this power, paying therefor a price equal to what equivalent power from other sources would cost.

In this hurried review of the public utility situation the question, "What is the public utility outlook?" is still unanswered. No one knows. Perhaps the best answer would be that, viewed from within the industry, it appears to be in excellent condition. There is a continually growing demand for service and, while it is true that utilities have felt the effects of the depressed condition of business, the decline has been less than that experienced by other industries. Generally speaking, the utilities are in sound financial condition and, barring continued undue political harassment, will be able to raise such new capital as shall be necessary to provide all additional facilities required to meet the growing demand for service. Rates are low and service is good. And in spite of the poison that has come out of Washington and the persistent efforts of an antagonistic and politically minded administration to destroy confidence in private management and confuse the real economic problems of the industry by injecting the social and political theories of extremists, there is every reason to believe that there is today a better public understanding of electric utility problems than ever before in the history of the industry.

On the other side of the ledger the problems of the utilities are mostly political or rather the result of political harassment. Unless and until there is some definite assurance that business will be permitted to function normally without the handicap of unjustifiable political interference, there will be bad times for everyone. Utilities, like every other line of business, will progress and prosper only when there is a reasonable belief that they can do so at a profit and not at a loss.

Taxes Are Rising

Then there is the ever growing burden of direct and hidden taxes. In 1937 the utility companies of the U.S. paid 76 per cent more taxes than they did in 1929. In California 15 cents out of every dollar of gross revenue is paid direct to the tax collector and the end is not yet in sight.

New and more rigid regulations—federal, state and local—are being imposed upon utilities every day. The cost of preparing reports and answering inquiries made by the numerous regulatory agencies having to do with utility affairs has grown to be a very substantial item of expense. One middle west electric company in 1937 furnished to state and federal authorities 21,726 pages of reports of various kinds. So far this year one federal bureau alone has submitted to my company 20,903 questions, bringing the total number asked since 1935 up to 60,649. These are not all of the "Yes" and "No" variety. Many of them involve the preparation of exhaustive analyses covering every phase of electric power production, transmission and distribution.

How much further the government may go in taking over the control and operation of business, either in a proprietary capacity or otherwise, time alone can tell. Insofar as the electric utilities are concerned, I am firmly convinced that, freed from political interference and harassment, they will continue on the time-honored course of proving their integrity and worth by providing more and better service at steadily decreasing rates.

Bonneville Power for Northwest Industry

Some Facts That Can't Be Ignored and Some Fallacies That Must Not Be Accepted as Facts

By WALTER W. R. MAY*
Director of Industrial Development
Portland General Electric Co.

SOME facts, fundamental in character but little recognized by the public, advance themselves in any appraisal of the industrial opportunity presented in the completion of the first two power units in Bonneville Dam.

(1) Bonneville Dam was conceived and authorized by Congress as a navigation aid further to open the Columbia River to safe, economical shipping which would move the raw materials and products of the interior country to market at a cost that would warrant the more rapid development of the interior.

(2) Desirable as this improvement was, no authority competent to act could economically justify the necessary expenditure purely from the standpoint of navigating the Columbia.

(3) When a plan was conceived that provided a dam not only as a navigation aid but also for the production of power—thus over a period of years returning a part of the cost—the expenditure was justified and eventually authorized.

The Government's No Magician

(4) There is no magic in governmental construction or operation of the dam that will produce power for industry or small consumers cheaper than comparable power can be produced by private enterprise. Private enterprise in this area has for 50 years provided increasingly more dependable electric power at progressively lower costs. During that time the government has neither financed nor subsidized the research and laboratory work that accompanied the growth of this public service.

(5) At the rates now set for Bonneville power—$14.50 a kw.-yr. for prime power at dam site; $17.50 a kw.-yr. on transmission lines—there will be available power cheaper than that heretofore provided by Northwestern private or municipal operations. But it will be cheaper only where the use of the power is fairly steady and at a high load factor—and this only because the government has fixed rates on not to exceed four-sevenths of the cost of the completed dam. Three-sevenths of the cost will be paid for out of general tax funds, because that much of the cost has been allocated to navigation and is

* Extracts from a paper before the Reed College Institute on Northwest Affairs, Portland, July 8, 1938.

therefore a charge that properly may be borne by the general funds of the U. S. The rate at Bonneville reflects no part of this three-sevenths of the cost, though increased taxes paid by industry will reflect it.

(6) Power for heavy industrial uses particularly may be expected to be cheaper than private companies have provided—also because Bonneville in no part of its $74,000,000 cost will pay any form of taxes. Thus the dam need earn and the rates reflect no part of the nearly $2,000,000 annually that would have to be earned and paid in taxes if the development were by private enterprise. Private investment creates tax-paying ability. Governmental investment does not.

(7) There are today in the Bonneville area no major power-using industries, except pulp plants and small chemical and smelting operations, that could appreciably expand because of cheaper power.

(8) There are in the U. S. and Canada six to eight major industrial operations, where the cost of power represents from 12 to 30 per cent of the operating costs, that may be interested in utilizing power at Bonneville (see table). Excepting pulp and, in a small way, chemical and electric furnace and smelting operations on Puget Sound, the eight or ten major industries in the Pacific Northwest today recognize the cost of power as only from 1 to 8 per cent of their operating costs. To them the power at Bonneville would be really cheap only if they could operate 24 hr. a day, 12 months of the year and thus raise their load factor.

SOME ELECTROCHEMICAL AND ELECTROMETALLURGICAL PRODUCTS WHICH CAN BE MANUFACTURED UTILIZING NORTHWEST RAW MATERIAL RESOURCES WITH THE FACTOR OF CHEAP POWER OFFSETTING THE FACTOR OF DISTANT MARKETS*

Product	Kw.-hr. Per Ton Required	Power in Kw.-hr. Used in Industry Annually
Aluminum	20,000 - 25,000	3,000,000,000
Zinc and Cadmium	2,200 - 3,200	510,000,000
Copper, Refined	140 - 250	500,000,000
Copper, Leaching Method	1,700 - 2,600	220,800,000
Caustic Soda and Chlorine	2,328 - 3,000	660,000,000
Metallic Magnesium	13,000 - 14,000	11,000,000
Steel	500 - 700	125,000,000
Ferro Alloys	5,000 - 10,000	1,125,000,000
Calcium Carbide	2,600 - 3,200	750,000,000
Abrasives and Refractories:		
Fused Alumina	2,000 - 2,500	380,000,000
Silicon Carbide	6,000 - 8,000	70,000,000
Silicon	12,000 - 14,000	24,000,000
Graphite	7,600	91,000,000
Phosphoric Acid and Phosphorus	5,400	81,000,000
Oxygen and Other Gases } Synthetic Ammonia } Hydrogen		50,000,000
Metallic Sodium	13,000	375,000,000
Potassium	2,000	15,000,000
Carbon Bisulphide	850	30,000,000
Pulp and Paper	1,200 - 1,400	2,000,000,000
TOTAL		10,017,000,000

*Figures based upon studies made by the U. S. Army Engineers in studying possibilities for industrial development on the Columbia River following the building of a navigation project in which the development of cheap power would be incidental.

No Industrial Monopoly

(9) Since Bonneville was begun, more than $500,000 has been spent by governmental, state or other public agencies and by semi-private agencies such as the Chamber of Commerce in collecting data showing Northwestern natural resources which can be utilized by heavy industry in combination with the power at Bonneville. These studies likewise explore markets and transportation costs on finished and raw materials. Before Bonneville was begun, $750,000 was spent studying the power and navigation aspects of the program on the river.

(10) Contrary to the fears aroused by those who opposed industrial use of Bonneville power that private industry would monopolize the power at Bonneville, no industrial user has thus far appeared who is willing to invest the money necessary to use very large blocks of Bonneville power on the terms and restrictions prescribed.

Let us now look at the fallacies—and the facts that explode the fallacies—that surround the public understanding of the industrial opportunities presented at Bonneville.

(1) A fallacy is that cheap power of itself, and alone, will attract heavy industry to the Northwest. The fact is that the power must be cheap enough to offset the cost of transporting the finished products to the normal current markets. Cheap power will not create industries here if other factors are predominantly unfavorable.

(2) A fallacy is that upon completion of Bonneville there will be a rush of industries to take the power and to bring about an over-night industrial era in the Bonneville district. The fact is that the work done by governmental agencies and our Chamber of Commerce and state bodies has produced only one reasonably certain industrial user of power at Bonneville—the joint operation of the Chipman Chemical Co. and the Pennsylvania Salt Co. to make weed-killer. The further fact is that the average industrial user of power now located in the Bonneville area uses power on less than a 25-per-cent annual load factor, or less than one-fourth of the time the power is available. On the kw.-yr. basis, and depending upon the number of kw. demanded simultaneously by the operation, the cost of Bonneville power to these users would be four times the $14.50 cost prescribed for dam-site power, or $58 a kw.-yr.

(3) A fallacy is that the use of power for industrial purposes would deprive the small consumers of the benefits of the Bonneville development. The fact is that if Bonneville power could be contracted quickly to industry which could use it on a high load factor, the small consumer would that much sooner get lower commercial, residential and rural rates as a result of Bonneville. The further fact is that unless heavy industry soon begins to use large blocks of Bonneville power there will be such waste of energy that, if the dam is to pay for itself, either the government must subsidize its use through heavier taxation or raise the rates for power.

Outward Harmony at Least

(4) A fallacy is that the spectacle of a public fight between the governmental agency administering Bonneville power and the community for arbitrary rates still lower than those prescribed by the Federal Power Commission will attract industry. The fact is that industry which has to date nibbled at the opportunity at Bonneville is inclined to wait until there is outward harmony between the community, the administrator and FPC.

(5) A fallacy is that small users in the commercial, rural and industrial fields can go to the dam and buy power wholesale without an appreciable expenditure of money for machinery and equipment. The fact is that if these small users and industries and municipalities could go directly to the dam and buy the power wholesale, they could not use it as it comes from the generators. Costly transformer equipment is necessary to step up or step down the voltage before the current could be taken and used. This intermediate step makes the cost of power as it is retailed to the small user from six to eight times the cost of generating that power at the dam.

There are other fallacies concerning Bonneville power and its industrial use that in time must be corrected in the public understanding, but these five are most frequently met with when the industrial opportunities of the project are discussed. These fallacies are not held by the engineers of private industry or by the men who direct the spending of private funds for the building of industry. But the public will be less impatient at slow progress and more helpful in the acquisition of new industries if it will understand some of these facts and disregard some of the fallacies.

It was the fallacious reasoning of some of our misguided and uninformed citizens and the request for an impossibly low rate which drove from Bonneville the best immediate prospect for an

industrial development of size and importance. The Bohn Aluminum and Brass Co. investigated the opportunity Bonneville offered for an expansion of its operations and the use of American raw materials three years before the project was completed. To be sure, the company asked for a rate of eight-tenths of a mill per kw.-hr., which was less than half the rate ultimately fixed. This company might have taken 20,000 kw. the first year and ultimately ten times that amount of power for an enterprise which would have employed thousands of workers and yet would not have prevented the small customers and miscellaneous industries from using Bonneville.

Needed: Some Changes

The uproar that accompanied Mr. Bohn's ambitious announcement did two things to those interested in industrial development of this region. First, it discouraged Bohn and his associates from negotiating on the rate, or in fact, from considering a $10,000,000 investment in the community. Secondly, it had the effect of making Congress enact a law governing the sale of Bonneville power so restrictive as to make major industry shy away from large investments in this field. Because of these restrictions on the amount of power available to industry and on the life of contracts for power, together with the priority granted to municipalities, industry will be slow to make large investments to utilize this power. Unless the law is changed or the administrator can convince industrialists of his understanding of their problems, win their confidence and assure them that he will be able to maintain a contract without political interference, there will be little industrial development.

Despite these untoward developments, there has been focused on the Pacific Northwest, and on the Portland and Bonneville area particularly, the attention of industrialists the world over. Bonneville, and to some extent Grand Coulee, are major developments in the program of federal spending. Today the prophecies long ago made that the next great theater of commercial operations would be in the Pacific Basin have begun to mean something to industrialists.

Just as the very presence of Bonneville Dam on the Columbia River has quickened the pulse of forward-looking industrialists and engineers and stirred the laboratories to keener research and the market analysts to sharper figuring, so has it awakened within Northwesterners a faint flicker of industrial consciousness.

Provided human ingenuity will overcome the obstacles, there exists at Bonneville power cheap and abundant enough to reduce the phosphate beds of Idaho and Montana into valuable fertilizer. To convert the chrome deposits of Oregon and northern California into the stuff that makes rustless iron, stainless steel and chromium plate. To smelt the iron deposits of Columbia County. To make from the clays of Oregon and other Pacific Coast states refractories and ceramics. To turn the aluminum clays of the Western states into aluminum alloys. To change the brines that lie beneath the dry beds of vanishing lakes in Oregon into chlorines and caustics. To extract bromine from the sea water and saline springs at the coast.

Only a keen and imaginative engineering mind can foresee the numerous uses to which Bonneville power can ultimately be put in the use of the manganese deposits in northwest Washington in making the aluminum alloys which are yet to be produced in the "battle of the metals" now under way in the electrometallurgical field; of the uses to which our silica rock, our iron and coal can be put in making ferrosilicon for abrasives and magnetic steel. It is inconceivable that we shall indefinitely be one of the great gathering places of scrap iron to be shipped abroad when at Bonneville we could, by the proper use of our chrome ore, scrap iron and coal, produce a ferrochrome for which there is already a large real market.

Rayon, the Northwest's Cotton?

Nowhere in all America does there exist so great a stand of timber suitable for the making of either rayon or paper pulp as within the 200-mi. radius of Bonneville. If we can compose the economic factors of labor costs and transportation of finished yarn and fabrics, we may see a great development in producing viscose rayon yarn from our forests. Rayon can in time and in a way be to the Northwest what cotton has been to the south.

How do we know these things? Because the million dollars, more or less, spent by the U. S. Army Engineers, the Oregon State Dept. of Geology and Mineral Industries, etc., have produced a library of information revealing these and other facts. We need to popularize and exploit these studies.

The conclusion is inescapable: All forces of the community should combine with the initiative of private capital now to see that these factful studies are used. But it is no less incumbent on us to do some clear thinking and far-sighted planning to avoid expending our energies and money in vain attempts to acquire industries not suited to the peculiar advantages we have in Bonneville. The real opportunity before us is to encourage and plan for the development of those industries that are normal and natural in this area as a result of cheaper tax-free power, and to steel ourselves against the temptation to force the growth of industries that ultimately would fail for lack of accessible economic markets because of high labor or transportation costs or for other reasons.

Oregon has been industrially handicapped by the lack of natural gas, petroleum and industrial coals. Bonneville power can be made useful in offsetting this handicap. It is electric power which may sell at half its cost and without burden of taxation, thus becoming the cheapest known industrial force on the continent. Enough evidence is at hand to guide private enterprise in using it if, through the establishment of confidence between private industry and the Bonneville administrator, we can remedy some of the shortcomings of the present law—shortcomings which are there because of the political prescience of men and the confusion of the public mind at the time the law was enacted.

Mental Urgency

There is one final natural resource that, to my mind, is necessary if we are to find the right combination of raw material, all-year mild climate, cheap power and tidewater transportation. That resource is what a great newspaper man once called "mental urgency."

We need in this community the mental urgency to utilize the natural advantages, climatic resources, raw materials, man power and money we had here long before Bonneville power became a reality. The danger that confronts us as a community is that too many people, expecting Bonneville to do the impossible, will do too little to bring sound industries here. The danger that confronts private industry as a whole is that it will be too slow to recognize the opportunities at Bonneville and consequently will invite the governmental agencies to embark upon the manufacture of agricultural chemicals and fertilizers, or chemicals and metals for our Army and Navy. Private industry has a responsibility as well as an opportunity. If it shirks the one, it must not expect the other to last indefinitely.

The industrial opportunity presented at Bonneville calls for the community to lay aside personal and political prejudices and to thwart those demagogic spokesmen who would make of Bonneville a political hobby-horse instead of utilizing it for what it is—an aid to navigation and a source of tax-free cheap power for heavy industry, for state-regulated public service utilities and, through them, for the people.

Water Power + Mineral Riches = A Future

But an Electric Bill Saving of $1.68 a Year Does Not Equal a Northwestern Farm

By DR. EDWIN T. HODGE*
Professor of Economic Geology, Oregon State College, and Consulting Geologist, U. S. Army Engineers

MINERAL exploitation, through electrochemical and electrometallurgical technologies, offers the people of the Northwest, now living in an area of highly unbalanced industrial development, the greatest expectancy of securing future industrial benefits.

To understand the present situation and to grasp thoroughly the problems confronting this country, it is well to review a few established facts:

Oregon, Washington, Idaho and Montana—the Oregon country—comprise 13 per cent of the land area of the U. S. but have only 2.8 per cent of the population. This population consists of seven industrial workers for every ten agricultural workers. If forestry workers are classed as agricultural, then the agricultural population consists of thirteen and the industrial population only four. This ratio of 4 to 13 should be compared with the national ratio of 10 to 10.

A similar picture is obtained if we examine the problem from the standpoint of dollars. In the nation as a whole it takes six manufacturing dollars to balance one agricultural dollar. In the Northwest only $2.50 are produced for each agricultural dollar. Since there are more than three times as many agricultural workers as industrial workers, we should expect less than $2 from our industrial workers. The larger return seems to indicate a 25 per cent greater efficiency of our industrial population.

$450 Against $574

In 1929 the per capita value of the Northwest's manufactured products was $450. For the nation it was $574. This difference of $124, or more than 25 per cent, should also be credited to Northwestern industrial efficiency; or perhaps both percentages should more rightfully be considered the 50 per cent handicap under which Northwestern industries work.

The excess of two and a half times of agricultural population here cannot be credited to the farmers' greater prosperity. Since 1917 the national income of all workers has increased about 20 per cent; but in the same period the income of Northwestern farmers has decreased from $1,020 to $475. The farmer should now get about $1,224 each year; instead he has suffered a loss from his 1917 annual income of $749.

During this time the Northwest had 5 per cent of the nation's harvested land, 10 per cent of the grazing land and 16 per cent of the forest land—or 31 per cent of the nation's productive agricultural land, or 13 per cent of the nation's area. The land of the Northwest was two and a third times as productive as the nation as a whole.

Not only is this true, but all the types of lands produced a unit value in excess of the national average. The Oregon country produced one-fifth of the nation's wheat, one-third of the nation's apples and pears, one-fourth of the nation's sheep and wool and one-

* Paper read at Reed College Institute on Northwest Affairs, Portland, July 8, 1938.

tenth of the nation's fishery products.

On agricultural land two and a third times more productive than that of the nation, the farmer got, not the 30 per cent he should have gotten, but only 5 per cent of the agricultural value of the nation. He got one-sixth of his due return.

Nature has been more than generous; the farmer has worked hard. But neither he nor the Northwest's industrial workers have been prosperous. They have added only 2 per cent to the nation's wealth.

Something which will give the forest-working industries a fair prosperity has also been lacking. The Northwest has one-half of the U. S.'s timber, and one-fourth of the Northwest's people are dependent on forest resources. These workers are depleting the forests at the rate of 13,000,000,000 ft. per year, while the forests are adding only 4,000,000,000 ft. per year. In four to six decades we may have no forest. Forests furnish three-fourths of the tonnage and three-sevenths of the value of all the Northwest's exports.

Rapid depletion and an enormous exploitation of our woods should be the result of great profit. Yet the fact is that the margin of profit is very, very small.

One-Third the National Profit

Agricultural and forest lands of exceptional productivity are being exploited at a rate that is exhausting the forests and impoverishing the land. Because both industries must sell in a foreign market, both receive a return of only one-third that obtained by similar industries throughout the nation.

The miner's situation is the same. The Northwest produces one-eighth of the nation's copper and one-fourth of its lead and silver. Yet, because it all must be exported to a foreign market for industrial use, the Northwest gets a small return.

And because of the limitation of a foreign market, only the more valuable metallic minerals are mined.

The lack of industrial population and the excess of agricultural and forest population forces us to import much mineral that we ought to produce for ourselves. Non-metallic minerals form approximately one-fourth of the tonnage and one-ninth of the value of all our imports.

The Northwest is rich in non-metallic minerals as well as in metallic minerals. Many of the latter can stand the cost of shipping to an export market. But non-metallics have a much lower per-ton value and must be consumed or fabricated close to the mines. Since the non-metallic mineral industry is 75 per cent of the whole mineral industry of the world, it is evident that the Northwest might well stand an expansion of 300 per cent. For the nation as a whole, the non-metallic mineral industry is three times more productive in money than the metallic. In 1935 it produced $2,840,000,000. In the Northwest, however, the non-metallic industry is only one-third as productive as the metallic. Hence, it should be increased nine-fold to reach the national average. But only through manufacturers that depend on non-metallics being developed in the Northwest can it be expanded.

There are, therefore, three types of resources exceptionally bountiful in the Northwest: agricultural, forestal and mineral. Of these, the agricultural and forestal and metallic mineral are exploited to their limit. The non-metallic minerals are not exploited because of the absence of nearby industrial development.

The Northwest's exports are: first, wood; second, foods; third, metallic minerals. Its imports are: first (78 per cent), manufactured goods; second (10 per cent), non-metallic minerals.

The question now arises: What new non-competitive manufacturers are expectable in the Northwest? What industries are growing most rapidly and are therefore least competitive?

They are the electrochemical and electrometallurgical industries. These industries depend on (1) non-metallic minerals, (2) wood, (3) chemical coal and (4) cheap and abundant electricity.

From 1933 to 1937 the electrochemical and electrometallurgical exports of the U. S. increased 36 per cent faster than all other merchandise exports.

Norway Points the Way

Since about the close of the World War, Norway's electrochemical and electrometallurgical industries have grown 50 per cent faster than all her other industries. If the Northwest used its water power to create the products obtained by means of Norway's water power and sold in the U. S., it could add $9,000,000 to its annual payroll.

The electrochemical and electrometallurgical industries are highly advantageous to labor. In Norway the average distribution of costs is: electric power, 14 per cent; raw materials, 44.5 per cent; wages, 20.5 per cent; capital costs and profits, 21 per cent. Were the labor required to produce the raw materials—mainly minerals and wood—added to this 20.5 per cent, labor costs would actually amount to 43 per cent.

The Northwest has two-thirds of the water power of the U. S., one-half of the timber and great resources in chemical coal and metallic and non-metallic minerals. These are the ingredients of the electrochemical and electrometallurgical industries.

The wood industry or any other chemical industry using organic raw materials cannot stand alone because each uses more mineral than non-mineral in its process.

Hence, the future of the Northwest appears to lie in the use of our great water powers to serve electrochemical and electrometallurgical industries. These industries are growing so rapidly that their creation here will not injure existing industries, but will serve our growing needs and enrich our lives. Their establishment will justify our water power development program. They will open up the dormant non-metallic mineral resources and thereby give much employment to labor. They will form a local market for our wood and our metallic minerals and thus yield a larger profit to the producer. The ninefold increase in industrial workers and the greater increase in profits for existing and new industries will afford a local market for our farmers.

Does $1.68 Equal a Farm?

The exploitation of our mineral resources would be impossible except for our water power resources. The development of these two resources is complementary. Hence, our water powers should be made first to serve the mineral-electrical industries. By such use, the forester and the farmer stand to benefit most.

Because of what benefit is it if the farmer saves $1.68 a year on his electric bill and loses his whole farm? Would it not be better to provide him (and the lumberman, too) with a large, profitable market through a program of electrochemical and electrometallurgical development?

As to the mineral resources, it can be briefly said that they are abundant. We have large deposits of chemical coal, the largest deposit of phosphate rock in the world, the largest deposit of magnesium ore in the U. S. and the largest deposit of first-quality clay in the U. S. We have potentially large deposits of many other minerals.

All these facts point to the Northwest's future.

That future lies in the use of wood for chemicals and not for export lumber, and in the use of the mineral resources and water power for electrochemical and electrometallurgical industries. For if we seize on these advantages, we can give employment to the number of industrial workers required to balance the agricultural workers. And by adding 1,800,000 industrial workers to the present 800,000, we will multiply by 300 per cent the market for the farmer.

Something New

How a bank helps dealers sell roasters on 12-month terms

Nothing new is a bank's financing of a house purchase or automobile purchase or refrigerator purchase. But definitely new is a bank's financing of a roaster purchase.

That's one reason why Southern California Edison Co.'s current Westinghouse "Automeal" roaster campaign deserves special mention: The Bank of America is enabling dealers in Edison territory to offer roaster buyers terms of $2.95 down and the balance in twelve months.

This participation by the bank, combined with the utility's similar financing plan, undoubtedly accounts in large measure for the campaign's success. During July alone—always a slow month—company-dealer sales totaled 2,500 roasters. And by the end of this month, when the campaign is over, the Edison domestic sales department expects to have chalked up a sale of more than 4,000 roasters. After that the roaster will be plugged only as an over-the-counter item.

Credit for the campaign's success also should be given the advertising—via 170 daily and weekly papers; the Edison consumer magazine, *Electrical Times*, and radio. Copy theme of the newspaper ads, run every week, has been one of the advantages of the roaster, particularly its adaptability as a plug-in kitchen (see cut).

Additional push was put behind the campaign by utility employees, who were given bonuses for leads and sales.

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Vital Facts

More news about what the public wants in electrical appliances

Questioning of the thousands of visitors to Utah Power & Light Co.'s "Home of Ideas" reveals facts vital to electrical men everywhere, and especially to electrical men of the Rocky Mountain region.

Greatest interest in the completely decorated, electrified home is in the dishwasher, waste disposal and plug-in-strip convenience outlets of the kitchen.

Asked what electrical appliances they most wanted, people listed the following in order: (1) Furnace with stoker and air conditioning; (2) refrigerator, (3) range, (4) complete home laundry, (5) automatic hot water heater, (6) dishwasher sink, (7) garbage disposal and kitchen ventilating fan and (8) bathroom heater.

Illumination would be obtained from an indirect, built-in system supplemented by table and floor lamps. Second choice would be a combination of ceiling fixtures and floor and table lamps.

Contrary to public opinion in other sections of the country, only 25 per cent of the Home of Ideas visitors consider convenience outlets a necessity.

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CP Range

The gas industry pops up with a new and, they say, improved range

A new and tough competitor of the electrical industry is the gas industry's much publicized and advertised "CP" (certified performance) range. Produced by eighteen leading gas range manufacturers, the range is required to embody 22 points "of superiority." These are outlined by the magazine *Gas* as follows:

"(1) Dual-purpose simmer burners make waterless cooking easier than old methods. (2) Giant high-speed burners give fastest, most economical cooking ever known. (3) All top burners light automatically. (4) Non-rust burners make cleaning easy. (5) Top burners cut fuel cost more than one-third. (6) Fast broilers cut pre-heating time to a minimum and save fuel. (7) Improved insulation keeps heat in broiler for cooler kitchen comfort. (8) Smokeless broilers eliminate possibility of grease fires and smoke. (9) Broiler has automatic lighter. (10) One-third greater usable broiler areas save fuel and cooking time. (11) New broiler efficiencies cut fuel cost almost in half.

"(12) Range approved by American Gas Assn. (13) Fast ovens cut pre-heating time in half and save fuel. (14) New low-temperature oven cookery eliminates excess meat shrinkage. (15) Oven has automatic lighting. (16) Improved insulation keeps heat in oven. (17) Fast oven pre-heating saves time and cuts fuel cost. (18) New oven burner efficiency and insulation cut fuel cost. (19) New "stops" on all drawers and oven racks eliminate spillage. (20) Automatic oven heat control takes guess-work out of cooking. (21) All utensil drawers on roll bearings. (22) New oven vent keeps food vapors away from wall for cleaner kitchen."

●

HERE'S AN AUTOMATIC, LOW COST
plug-in kitchen
A PRODUCT OF Westinghouse
INTRODUCTORY
SALE OFFER
'AUTOMEAL' COMPLETE with UTENSILS and STEEL TABLE
$4.95 STURDY STEEL TABLE free
$2.95 DOWN
ONE YEAR TO PAY BALANCE
BROILER-GRIDDLE UNIT $4.95 EXTRA
AUTOMEAL
Cooks an entire meal for 8 people
Here's the electric roaster that has everything! It occupies only two feet of space, yet performs every cooking operation quicker cheaper and easier. It roasts, broils, bakes, toasts, grills, fries—yet uses no more electricity than a modern electric iron. Plugs into any electric outlet. No special wiring necessary. Cash price $24.95 complete with utensil set and a valuable free table. Easy terms. Broiler-griddle unit for grilling, toasting, and frying is $4.95 extra. See the Automeal today
AT ALL DEALERS... or your EDISON OFFICE

Roaster campaign ad

Trade Dinner

A brief review of some important speeches on selling

After V. E. Vining, Westinghouse's department store manager, had jumped up on a table, a bacon and egg smoking on the overheated iron in his hand, no one of the 750 dealers, salesmen and distributors who packed the dining room of the Western Merchandise Mart, San Francisco, for the annual fall market Radio & Appliance Trade Dinner, could forget his challenge. "I dare you," he said, "ever to sell a cheap electrical appliance without thinking of what I have shown you here."

Vining's speech was the climax of the meeting. Swinging at those who employ salesmen, he begged that they quit acting as though selling were some mysterious cult and reduce it to the simple thing it is.

"All there is to it is that a man wants to trade something he has to someone who needs it for money, marbles or chalk. If that person needs it, the salesman is doing him or her a real service. If not, it's trickery. Selling isn't a game. In a game somebody loses. In selling everybody wins. It is a business. And all a business consists of is finding a man or woman who needs your product, explaining it and asking for the order."

To illustrate the simplicity of explaining a quality product, Vining produced two electric irons. With the cheap iron he showed the danger of burning a towel he ironed. Then, in

order to drive home the idea of waste heat coming up to plague the woman ironing with it, he draped the iron with a bacon and egg. As the bacon burst into flame, he leaped to the table and issued the dare which brought down the house.

L. J. Stutz, sales manager of Majestic Radio & Television Corp., had less luck with his surprise feature. He had arranged to pipe in a personal vocal appearance of Edgar Bergen and Charlie McCarthy (whose sardonic figure is now tied in with a midget set being promoted by the company), but somehow the wires gave trouble. So he talked instead on the merchandising outlook and called on the appliance and radio industry to quit the "crazy merchandising" of the past year. Inventories are lower now, he said; unit sales are higher, and manufacturers and distributors have less tendency to put dealers into unprofitable selling schemes.

Three types of radio sets, he said, continue to sell well: the small set that can be carried by the purchaser from place to place; the console (figures indicate that 26 per cent of those in use were made before 1929), and the combination radio-phonograph now coming into favor. A market potential of four sets per home still exists, he maintained.

R. C. Cameron, Kelvinator sales manager of household appliances, opened the session with a talk on the Salesmen's Crusade, started by Kelvinator but adopted by business generally. To prove the result of asking for business, he unwrapped a large bundle of purchases he had made at a local drugstore because the salesman who waited on him asked him to buy.

Mere talk will not start buying, he said, urging individual action from each one present—a personal pledge to start at least ten sales conversations a day. "You may not finish them all," he admitted, "but determine to yourself to start them anyhow." The combined effect of this forward-looking, order-asking action is bound to reflect itself in all lines of business, he concluded.

Larry B. Quimby, in charge of the appliance department of John Breuner Co., Oakland, and chairman of the appliance division of the mart, presided. E. J. Hinchey, vice-president of the James Graham Mfg. Co., San Francisco, was toastmaster. Arrangements for the dinner were made by George L'Amoreaux, promotion manager of the merchandise mart.

Buying at the market was noticeably different from that at previous markets, several exhibitors revealed. There were fewer "lookers," such as visited the mart when it was first opened; more of those in attendance were intent upon buying. Reports on the buying volume were variable, but on the whole the buying was cautious and firm.

Top — V. E. Vining at his triumphal climax; Toastmaster Hinchey. Bottom — L. J. Stutz; R. C. Cameron

Future Campaigns

As the year points to its close, sales drives spring up everywhere

Following utility-dealer campaigns have been scheduled for the next several months:

Central Arizona Light & Power Co.—During October and November the company will stage an educational demonstration campaign on IES lamps.

Denver Electrical League—September and October, campaigns on IES lamps, roasters, adequate wiring and refrigeration.

Idaho Power Co.—October and November, campaigns on lamps globes, IES lamps and ranges, refrigerators and water heaters. The lamp globe campaign is an annual affair conducted by meter readers and service men. IES lamp campaign will have the assistance of home service girls.

La Veta (Colo.) Light, Heat & Power Co.—September and October, lighting campaign.

Los Angeles Bureau of Power & Light—During October and November, a range campaign featuring EHFA prices of $2.96 per month.

Mesilla Valley Electric Co., Las Cruces, N. M.—September, range and water heater campaign; cooking school. October, IES lamp campaign.

Montana Power Co.—November, an IES lamp campaign featuring low-priced lamps aimed at the unprofitable customer.

Mountain States Power Co., Casper, Wyo.—September, lamp bulb campaign. October, lamp bulb and IES lamp campaigns.

New Mexico Public Utilities Corp., Gallup—September and October, adequate wiring campaign.

Pacific Power & Light Co.—October and November, light conditioning campaign. In October the company will sponsor its fourth annual radio show, featuring 1939 models. Dealers in each community will cooperate in exhibiting sets. Company will provide the hall and entertainment.

Portland General Electric Co.—October and November, range and water heater campaign.

Public Service Co. of Colorado—September and October, campaigns on adequate wiring, vacuum cleaners, radio, lamp bulbs and home laundries. September, October and November, IES lamp campaign. Sales contests will feature the campaigns.

Puget Sound Power & Light Co.—During October and November the company will have campaigns on ranges, refrigerators and water heaters. Dealers will promote IES lamps.

San Diego Bureau of Radio & Electrical Appliances—In October the bureau will promote radios. Electrical show has been tentatively set for Nov. 28.

Sierra Pacific Power Co.—In October the company will tie in with dealers on light conditioning campaign.

Southern Colorado Power Co.—September, campaigns on roasters, ranges, water heaters

"Get a grip on yourself before you look. I'm afraid Blotz is developing Corona."

and IES lamps. October, IES and Mazda lamp campaigns. November, IES lamp campaign. Lamp campaigns are all-employee activities.

Southwestern Public Service Co., Carlsbad, N. M.—September, roaster campaign. October, IES lamp campaign.

Utah Power & Light Co. and subsidiaries—October and November, campaigns on portable lamps and fixtures, major appliances and commercial lighting. During the two months the company's light-conditioning truck will be taken to all divisions and demonstrated to all commercial customers.

Western Colorado Power Co., Montrose, Colo.—September, lamp bulb campaign.

Rocky Mountain Electrical League—Light conditioning campaign of indefinite duration will start this month. Sponsored by the league and supported by the Public Service Co. of Colorado, General Electric, Westinghouse and other utilities, manufacturers and distributors, the campaign is said to be the biggest thing of its kind attempted in the inter-mountain region. Fifty thousand dollars will be spent during the first four months. The activity is not only directed toward sales of lamps, fixtures, wiring, etc., but it will also embrace an educational program among school and public officials, the optical profession, etc. All forms of advertising will be used. Approximately 5,000 club women, members of Parent Teachers' Assns., etc., will participate in a contest, object of which is to obtain home light-conditioning demonstrations. A contest for children and parents will carry several hundred dollars worth of prizes. The Denver *Post* will cooperate with the drive. A barnstorming troupe will travel over the territory to acquaint the public, dealers, etc., with the movement and to obtain local participation. To assist in launching the program, Glenn R. Trumbull, manager, Better Light-Better Sight Bureau, and E. D. Stryker, incandescent lamp department, General Electric, furnished all delegates to the RMEL Yellowstone Park convention with information. A special committee of fifteen men are conducting the movement under the chairmanship of J. T. Coatsworth, manager of the Electric Institute, Denver. F. R. Jamison, chairman of the league's advertising and publicity committee, is in charge of advertising.

Electric Appliance Society of Northern California—Started Aug. 22 and lasting 60 days is a unique experiment in ironer selling. San Jose is the testing ground. All ironers have been increased $10 in price. Believing that something is very wrong with the ironer business, the society will seek a remedy by: (1) Teaching new and perhaps old purchasers to use ironers in their homes. Specially trained teachers rather than salesmen will do the job. Of the $10 increase, $6 to $8 will be spent in this teaching. (2) Making ironer sales more profitable to the salesmen and relieving him of the responsibility of instructing the purchaser in the use of the ironer. A bonus of $2 is provided the salesman from the extra $10. (3) Decreasing the dealer's sales cost and increasing his volume by removing public doubt as to the practicability of an ironer. Securing the retail salesman's interest and giving him more productive selling technique. Enlisting cooperation of wholesale distributors to police and insure the successful operation of the plan. Committee in charge of the event includes: Dealers—C. R. Van Sant, chairman; F. M. Downing, C. H. Williams, Frank Accardi. Utility—Ross Van Gundy. Distributors—A. C. Scott, George Dickie, C. T. Bauman. Bert W. Reynolds, promotion manager of P.G. & E., will represent the society. Staging the meeting at which the program was launched were: Van Gundy, Williams, Bill Sheehan, Bob Flanders, C. H. Huffman, Van Sant, Dickie, Jack Ross, Reynolds and wives and friends of the campaigners. Participants in the campaign were told to: "Forget shirts. Agree with any woman who thinks she can't iron them and tell her to send them to the laundry. But tell her that she can save a third of her ironing time if she never does a shirt or a sheet, and that her investment in an ironer for other work alone will more than repay her."

●

Sales Shorts

Women's committee; EHFA contract; prize winners; courtesy discounts, etc.

ALTHOUGH NO DIVISION is required to accept the ideas, chances are that activities of Southern California Edison Co.'s women's committee during the period from September 1938 to June 1939 will be about what Miss Jeannette I. Rees, head of the committee, has suggested. The four objectives she set up are: education relative to the industry; development of the individual's personality, initiative and leadership; promotion of friendly public and employee relations, and loadbuilding. During the year just finished loadbuilding work of the committee resulted in an estimated new revenue of $60,000.

●

PUGET SOUND POWER & LIGHT CO. has closed a contract with the Electric Home & Farm Authority providing for cooperation in the financing of appliance sales in nineteen counties served by the company.

●

SECOND PRIZE WINNER in the Modern Kitchen Bureau's water heater window display contest for dealers and utilities was Idaho Power Co.'s Pocatello office. Utah Power & Light Co.'s Provo office won one of the ten third prizes.

●

MERCHANDISING DIVISION of Westinghouse Electric & Mfg. Co. has issued a statement that it "definitely opposes the giving of courtesy discounts and pledges that no member of the merchandising division will encourage or participate in any such practice." The Westinghouse Agent-Jobbers' Assn. has endorsed the stand.

●

SOUTHERN CALIFORNIA'S APPLIANCE dealers are supplying the Electrical Development League with the names and records of all salesmen. The completed list will be indexed and will serve as a basis for the area's salesmen's clearing house operation.

Nowhere else in the U. S. do refrigerator dealers advertise together as they do in Fresno. In addition to the individual advertising of product, these dealers cooperate in a complete refrigerator-buying directory—run all during the season and listing not only dealer names but also makes of refrigerators—to assist buyers in surrounding country to drive direct to the stores or refrigerators they select

ELECTRICAL WEST

Appliance Sales Guide

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Know Why - -

an I.E.S. Lamp is built as it is so that you can sell it more effectively

Did you realize that you already have a stake in the I. E. S. lamp if you have one in stock or have ever sold one? Part of the cost to you or your company was spent as an investment in a nation-wide promotion and advertising program to make it easier for you to sell it. The stock on hand already bears your share of this cost. The stake you have in it makes it still more vital that you make this earn you back a dividend. To do this will require that you convert the value of that national advertising into sales by knowing why the lamp is certified and what it does for the customer who buys one from you.

Surprising as it may be to you because of your familiarity with it and with the tremendous amount of advertising given the I.E.S. certified lamp, the number of people who yet have not been made really *conscious* of it is large. You cannot afford to take for granted that the customer already knows why she should buy. She may not have been listening when the story was told her repeatedly before. If she is thinking of lamps now it is a safe bet that even if she has heard the advantages of the I.E.S. lamp it will not hurt to repeat them. "Old stuff" to you, maybe, but "brand new" to your prospect.

Refresh your own memory from this condensed reminder list of the reasons for each peculiar point about the I.E.S. lamp. They will enable you to answer questions that may arise. They will give you convincing reasons why the customer should buy, and help you close more sales. These reasons will give you courage to *sell up* to a better quality lamp with more profit to all concerned.

What is the I. E. S. ?

It is a professional organization of the world's leading lighting and seeing authorities, a non-profit society. It derives no profit itself from the sale of the lamps. At the request of the U. S. Government it developed these specifications principally to improve lighting in student rooms at the military academies. Any manufacturer is permitted to make lamps to these specifications provided he lives up to the 54 points required. Only lamps so built will be certified and be permitted to use the tag.

What are the requirements?

Of the 54 points, 11 are for seeing safety, 14 for electrical safety and 29 for mechanical safety and quality. Of the 54 requirements, 39 cannot be seen by ordinary inspection. Therefore the Electrical Testing Laboratories have been authorized to check the product of manufacturers who make lamps and wish to have them certified. They are given complete chemical, electrical, mechanical and lighting tests.

For instance, what ?

The table model study lamp must be stable. It must be heavy enough and so balanced that it will not fall over if tipped as much as 10 deg. in any direction.

The material of the cord and plug must be mechanically strong and electrically safe. A pull of 75 lb. will not dislodge the wires. The cord must be of Underwriter's labeled

rubber or durable cotton braid to give both long life and good appearance. Length of the cord is at least 7 ft. for convenience in use. All details of the electrical connections must be done in the required way, and careful assembly of the lamp is prescribed to give durability and trouble-free satisfaction.

Why the reflector ?

The translucent bowl is required to conceal the bright concentrated spot of the lamp bulb and diffuse or soften the light and so spread it as to eliminate shadows.

A definite part of the light must go upward in order to illuminate the room. It has been found by tests on the eyes that at least 10 per cent as much light should illuminate the surroundings as is concentrated on the work or reading below the lamp. This makes unnecessary any violent eye adjustments between the lighted page and the room should the eyes be raised.

Why a wide shade ?

If reading, sewing or other eye work is to be done by the light of a lamp the spread of light must be wide enough to cover the entire area being worked in. Thus one can sit in a normal, comfortable posture instead of twisting about to place the reading page under a narrow circle of light.

Why so tall ?

Height of the lamp has been carefully calculated for the type of use it will receive. Thus the table study lamp is for work or reading at a table, with papers and materials spread out. It requires a wide circle of light. The same is true of the floor type. The new end-table lamp is more for decoration and casual reading. It is designed for use on high end-tables near low chairs or couches. The swivel type is for use near a desk or chair to bring the light around closer to the work.

Shade material

Regardless of the outer material of which the shade is made, the inner surface must have a high reflecting value. It must also provide sufficient angle to spread a wide circle of light under it.

Foot-candle ratings

One of the most important requirements of an I.E.S. certified lamp is the amount of light delivered to the reading surface. Definite ratings are set for each of the styles of lamp according to its purpose, and at specified distances from the lamp. Of course the tests are made under definite conditions—a room with an 8-ft. 6-in. white ceiling, readings taken 30 in. above the floor; readings at 18, 24, and at 30 in. from the lamp. Naturally lamp placement, height of table or chair, height and color of the ceiling, will vary these performances in the home.

Style and Color

Although the first models of I.E.S. were limited in styles and colors there is a wealth to choose from now. If you cannot stock many styles, stock one or two of each type to help you sell from catalog sheets and pictures of others.

September 1938

Home Lighting

. . . When the

Sales Floor or Home

Whether it is the casual shopper who comes in to the store to "look at some lamps" or the prospect in the home considering a selling presentation you are making, the obstacles and resistances usually are similar. The way the objection or doubt is spoken may be different, or in some cases may not be spoken at all, but the obstacle to a sale is usually present. Few sales that do not clear up such doubts in the mind of a prospect are satisfactory, will bring repeat business for more lamps or appliances, or are sold up to better quality merchandise. Naturally every salesman or dealer aims to earn the satisfaction, profit or commission that a well-made sale returns. Likewise he wants to see more of his selling effort produce results. By being prepared in advance to meet such objections, and by clearing away the doubts and resistances completely when they do appear, he can convert more prospects into buyers, let less get away as merely shoppers to waste his time and that of other dealers.

Since taste and prejudice enter into the selection of an article of home decoration the salesman must be especially careful not to arouse antagonism by disputing the prospect's ideas or opinions. He must agree with them in principle, learn why the opinion was formed and then try to balance the scale in his favor by showing how his lamp will serve the need expressed, plus other values that make it a bargain indeed. In nothing else is a salesman so apt to kill his sale by trying to select the style for his prospect as in lamps.

These are the obstacles you will meet most often:

1. **Thinks the I.E.S. lamp costs too much.**
2. **Afraid it will cost too much to "burn" it.**
3. **Table models are too tall.**
4. **Don't like so much light in a room.**
5. **"Will not look good with my furnishings."**
6. **Just want a decorative lamp.**

Advantages of Good Lighting

The tools with which to handle such resistances are the **advantages** to be enjoyed by good lighting. Skillful combination of these advantages to overbalance an objection removes the doubts and fears and opens the way for the customer to purchase without misgivings. The advantages to be enjoyed by good lighting are:

1 **Protection of the most precious organs of the body, the eyes. Any loss in their efficiency necessitates expensive medical attention and takes a great deal from the enjoyment of life.**

2 **Correct lighting is conducive to healthful posture in children or adults.**

3 **Makes seeing tasks such as study, reading, sewing or hand work easier by speeding up vision and thus the ability to get from the text the information they need, or performing the hand operation accurately.**

4 **A cheerful home, with all of its colors, decorations, details seen at their best, and in their true colors.**

5 **A quality of light that adds to the appearance of you and your guests, that sets you apart in a charming background, that flatters because it eliminates hard, unpleasant shadows.**

6 **A safer home, for the light spreads evenly, to all parts of the room, and no half-seen objects lie in wait to trip you.**

7 **Pep up with good light, for it relaxes the nervous system, prevents that tendency to yawn or grow sleepy from eye-strain. A much more enjoyable social evening at bridge, for instance, with good, cheerful lighting.**

These are all **positive** advantages. As examples of how to apply them to the obstacles—

1 **"Costs too much?** Well, yes, I can appreciate that it does seem a good deal to pay when you can get lamps for almost any price. If it weren't so vital to the eye health of your family in the protection of the most precious sense you have—**sight**—; if it wasn't so important to making your seeing tasks, such as reading, sewing, studying, a pleasure instead of a chore; if it weren't for the cheerfulness that well distributed, glareless light contributes to a home, how it makes you look your best, brings out the charm and color of your furnishings and clothes—it would be sensible to buy cheap lamps. But with an I.E.S. lamp like this it isn't just another lamp, but you buy a worthwhile investment in a cheerful home, pleas-

THE MONTANA POWER CO. • IDAHO POWER CO. • UTAH POWER & LIGHT CO.
PUGET SOUND POWER & LIGHT CO. • PACIFIC POWER & LIGHT CO.

Prospect Says: "NO"

NO. 9B

I. E. S. LAMPS

Used to Dispel Glooms of Sales Resistance

ure in reading good books or in study, comfortable sewing, happy and peppy parties and games of bridge, yourself and your home seen at their best, as well as an attractive piece of home furnishing. Why not begin to enjoy these advantages right away?"

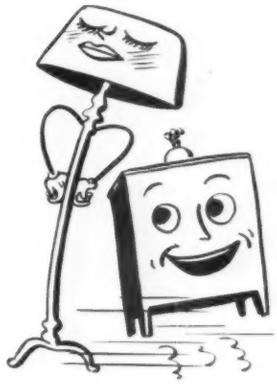
2 **"Costs too much to burn it?** A very prudent and important question and one I am always glad to answer because the cost to operate this I.E.S. lamp is surprisingly low. Possibly you may not have noticed that our electric rates here are especially favorable to the use of plenty of light for every room in the home. While this looks like a large bulb, it is made so for greater efficiency. I was surprised to learn myself that we get 27 times as much light out of our present Mazda lamps as we did in 1908 and pay only a fraction of the cost for them we paid then. If you use electricity for quite a few other purposes, as most people do, this lamp will operate very economically on the lower part of your rate; in fact it should not cost you more than about —— cents a night" (or month. Compute this from your local rate. The utility will help.)

3 **"Too tall?** Yes, it is tall, but perhaps I neglected to tell you why it is to your advantage to have a tall study lamp. The Illuminating Engineering Society, whose scientific measurements and eye tests have been followed in the design of this lamp, found that for study or reading, at the average table, this height gave the most even spread of light, brought all the books and papers or materials into easy view, and contributed to a healthy upright posture, as well as it gave protection to the eyes. We have I.E.S. end-table lamps for casual reading, but for study this tall, and really rather

good-looking, stately table model takes all the effort out of close eye work. Now that school has started, don't you think I had better send it right out?"

4 **"You don't like so much light in the room?** I can see that you have suffered from bad lighting and are determined not to make your eyes endure any more. But isn't it the **kind** of light, and whether it really contributes to your ease of seeing, your safety, your cheerfulness, your appearance and the appearance of your room and furnishings, rather than the **amount** of light? Out-of-doors, even in the shade, you have many hundred times as much light."

5 **"Will not go with your furnishings?** Yes, indeed, that is a very important consideration. I want you to be thoroughly satisfied on that score. That is why we stock a variety of bases and shades, so that you may select the kind most appropriate to your home color scheme and furniture styling. Each of these I.E.S. lamps will do its lighting with the same soft, restful quality of illumination that will make you look your most charming in a background that brings out each color and texture in your carefully selected furnishing and drapes. I can see that you have chosen each article with discrimination and care, with its color and its lines an important part of your decision. It would be a mistake now to destroy the color effectiveness and the style pattern by colored light that dulled or changed those colors, or distorted the



shapes of the furnishings by harsh shadows. An I.E.S. lamp will thus give you pleasure from the decorations you have selected with such thought and care, not only during daylight, but more important, at night, the time your guests will have an opportunity to observe your good taste. If you will select a base appropriate to your style of furniture we will look at shades in a moment."

6 **"You just want a decorative lamp?** Certainly. You know, we are fortunate that we have new I.E.S. end-table lamps that are both decorative and that are designed to give good, restful light. These are meant to be used on low tables near a couch or chair, or on other pieces of furniture. Here are a variety of designs in bases and shades, all of them scientifically designed to control the quality and direction of light so that your eyes are protected. See also how the bowl is arranged to throw a good deal of the light upward and around the room to add cheer, to bring out the colors in their true tones, and to make you look your best. Is your furniture maple, or walnut?—" (Such a question leads toward selection of a style and narrows down the buying decision.)

ROCKY MOUNTAIN ELECTRICAL LEAGUE • PORTLAND GENERAL ELECTRIC CO.
CALIFORNIA OREGON POWER CO. • WASHINGTON WATER POWER CO.

Don't Shout

in your advertising

Today the public is reacting against the too "loud" advertising. Especially when selling a Better Light for Better Sight it is well to avoid overstatements or wild claims. The matter is complicated a little by the fact that two types of eye specialists often quarrel on the issue. Don't be caught in between two fires. Stay on the safe side by talking in your ads in a tone of voice that you would use in speaking to a friend—sincere, plain, simple, easy to follow.

There has been a tremendous job of advertising and publicity done for the I.E.S. lamp. Your utility is also carrying on this campaign with persistent copy all during the lighting season. What you want is that the business stirred up by this publicity will come to you. Your ads, in whatever form, should tell the customer—"You've heard about these lamps; here is where you can get them."

A suggestion in this style is shown in the adjoining column. It can be used either in the local newspaper, shopping news, as a handbill, a window poster, or a window card. With slight modification it could be used as a letter.

Notice how the ad is constructed. It takes one of the *advantage* points listed on the inside of this Guide, and one of the *reason-why* points given on the front page, and simply invites the customer in.

"After all," said a noted ad man at a recent retail conference, "when we are talking to our customers, we are talking to our neighbors. We wouldn't think of yelling at them or chiseling our each phrase with a fine regard for fancy words. So why go high-hat in our advertising. Advertise to our customers as we would address them on the sales floor—with enthusiasm."

Turn Lamp Bulb Sales Your Way

Now that all Mazda lamps up to the 75-watt size sell for 15 cents there is a way to turn what otherwise is often considered an unprofitable sale into a business builder. Lamp bulbs are like sugar —they are often just an accommodation to customers. The thoughtless way is to sell small wattage lamps. But why not turn this situation into an opportunity for future sales. The 75-watt lamp is twice as efficient as two 40-watt lamps. Tell the customer this and sell the larger lamps. They give more satisfaction. They create the desire for higher levels of illumination throughout the home. This stimulates the possibility to follow-up with the sale of new fixtures, better floor lamps, lamps that control the light more satisfactorily. Look ahead to profitable sales by helping to raise the general level of illumination.

You've heard a lot

about the sight-saving, cheerful

I.E.S. Lamps

◆

They protect the most precious organs of the body—your eyes. Any loss in their efficiency necessitates expensive medical attention and takes a great deal from the enjoyment of life.

The Illuminating Engineering Society set up 54 requirements that these lamps had to meet to be certified by this tag. Ask us about them.

◆

And here is where you can get them

YOURSTORE & CO.
Hometown, West

The above is a plain ad, without even a picture. With one of the mats or electros that you can get from your distributor it can be made even more attractive. But notice that it does not try to say too much or say it too loud. Such a simple natural wording inspires confidence and paves the way for you to explain further advantages and reasons-why for buying.

Attract by display

The less money a dealer has to spend in advertising and publicity the more he should put of his own effort into spreading his personality over as many customers as he can reach. If he cannot budget cash to an advertising fund, he can budget definite time and work toward the making of an attractive display both in the windows and in the store. To create as homelike and natural a setting for lamps as can be done in a store is wise merchandising. As the dealer who made a mezzanine floor over his windows (shown above) with an 8 ft. ceiling of good reflecting value found out, it is easier to sell floor and table lamps when a homelike room, or corner, or balcony is provided.

Windows your best help

Several things make windows the most effective and economical form of advertising a dealer can use. First, every store has windows—it is a matter of using them wisely. Second, they make the impression on the customer right near the point of sale. If you create an interest and desire for the merchandise, all she has to do is walk inside the door to gratify that desire. Third, it is human nature to like to see what you buy. Belief is much stronger when the object is seen than when the customer is merely told about it. Fourth, a good window adds glamor to the merchandise. It is seen at its best, with good strong light, a nice background and color. The appeal is much stronger than otherwise.

But neat, attractive windows take time and effort. The less money to doll them up, the more work should be put into the display.

Table lamps and floor lamps look best in a setting that suggests the home use of those lamps. Show them with a comfortable chair. In order not to have the chair steal the show from the lamp use a figure in the chair if possible, reading or sewing. Or at least use cards that call attention to the lamp.

A window with a single I.E.S. lamp, and cards on the glass or near it with ribbons running to the important features of the lamp will help sell the real advantages of a Better Sight lamp instead of "just a lamp." Use the ideas contained on the front page of this Guide, if you like, to put on your cards. Price will not seem very important when you show the *reasons-why* and the real *advantages* of buying the genuine I.E.S. certified lamp.

INDUSTRY-WIDE PUBLIC RELATIONS committee has been named by E. Holt Gurney, president of the American Society of Heating & Ventilating Engineers, to clarify the public conception of air conditioning and define the service which can be expected from various kinds of systems.

●

WITHOUT BENEFIT of bargains to customers or bonuses to salesmen, Washington Water Power Co. and its dealers sold $52,500 worth of electric ranges, water heaters and commercial cooking appliances. The campaign, of 30 days duration, was held in honor of Kinsey M. Robinson, new president.

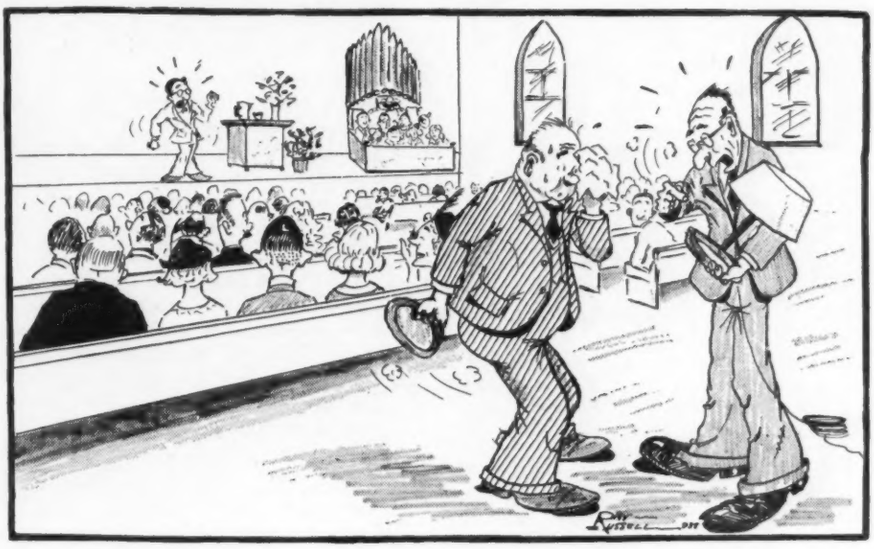
●

FIRST FULL-PAGE announcement of Crosley Radio Corp.'s new, simplified, 6-cu.ft., $99.50 refrigerator was made in Fresno, Calif., papers in an ad by the Famous Department Store. The model has been introduced in an effort to tap still lower income brackets.

●

GENERAL ELECTRIC CONTRACTS CORP. last month announced several changes in its G.E. appliance financing setup. Henceforth the company will insure both dealers and purchasers against loss, destruction or damage to the appliances during the financing period. To help farmers to buy appliances, the company also inaugurated two-, four- and eight-payment plans.

MORE LIGHT ON THE COLLECTION —by Russell



"With this IES rig, they at least can't act like they don't see the plate"

TO ANSWER the housewife's questions about canning in an electric oven, Utah Power & Light Co.'s home service department has published a pamphlet giving all necessary instructions.

APPLIANCE SALES REPORT---JULY 1938

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]		L. A. Bureau of P. & Lt.[2]		Montana Power Co.[3]		P. G. & E. Co.[4]		San Diego Cons. G. & E. Corp.[5]		San Joaquin Lt. & P. Corp.[6]		Southern Calif. Edison Co. Ltd.[7]		Utah Power & Lt. Co.[8]		Wash. Water Power Co.[9]	
	Current	7 Mos.	Current	7 Mos.	‡Current	‡6 Mos.	*Current	*6 Mos.	†Current	‡6 Mos.	Current	7 Mos.	Current	7 Mos.	Current	7 Mos.	‡Current	‡6 Mos.
Ranges	469	2378	380	2698	103	531	509	1909	45	255	111	846	259	1821	307	1540	233	1065
Water Heaters	208	1208	122	859	30	100	396	1116	45	255	58	382	98	695	175	511	202	714
Air Heaters, aux.	2	176	23	478			85	2545	25	610	6	129	35	775	13	380	12	405
Air Heaters, 220			11	260			60	378			14	216						
Refrigerators	712	3143	3499	18435	837	3115	5356	22264	800	3750	631	3817	3894	20924	1293	4394	1070	3914
Dishwashers	1	11	9	83			16	75			7	44			3	22	1	4
Washers	365	2246	1657	11087	438	2416	2439	13383	325	1900	248	1818	2143	13725	661	4294	400	2430
Ironers	36	243	366	2086	31	252	434	2288	55	315	43	488	264	1847	60	276	36	192
Vacuum Cleaners	92	610	516	3418	216	1393	1913	11664	225	1320	40	581	901	5883	228	2226	189	1109
Radios	438	3754	2809	17765	582	3646	7134	46114	800	5275	308	3191	3275	26395	890	6854	923	5879
Mixers	37	339	151	1043			337	1808	125	760	38	282	235	1633	82	818	149	799
Cookers, Casseroles	35	129	113	545					85	430	46	299	111	499	106	476	685	2130
Irons	408	2499	745	4180					475	2600	324	2034	995	6467	922	5149	679	3759
Waffle Irons	78	661	285	1496					175	950	53	496	302	2146	262	1667	158	1006
Toasters	118	956							350	1875	87	825	406	3122	284	2155	298	1985
Table Stoves	349	1179	193	1168	627	4722			100	440	74	483	203	1558	886	3452	182	946
Heating Pads	7	273	43	814					60	670	8	233	57	1102	69	1018	47	647
Curling Irons													29	256	128	1056		
Coffee Makers	178	1021	154	518					400	1840	90	735	249	1975	279	2277	367	2265
Sewing Machines	16	76					301	2949	95	515					135	941	42	356
Clocks	65	534	282	1392					300	1750	121	975	407	3329	256	1400	218	1286
Fans	596	826	364	834							636	1426	570	1301	109	296	468	789
Floor Polishers																		
Sun Lamps		47											6	164	5	56	4	35
Reflector Lamps	143	1326									121	949			445	4023	246	6934
Miscellaneous Lamps	143	1547			434	3496							665	4270	575	3966	753	4295
Yard Lights											48	328						
Misc. Small Appl.			212	1697					500	3500	43	692						

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers—about 60%.

[2] Compiled by Los Angeles Bureau of Power and Light for territory served by that system.

[3] Combined dealer and company sales from report of Montana Power Co.

† Does not include dealer figures for two divisions for January and February, 1938.

[4] P. G. & E. reports sales of major appliances only based on accurate reports from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. *Due to delays in compiling report current and total figures are always one month behind those figures of companies reported in other columns of this table.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures includes fans, curling irons and sun lamps.

[6] Includes dealer reports from Midland Counties Public Service Corporation also. Compiled by Valley Electrical Supply Company.

[7] Includes reports from dealers on San Joaqin Valley system of company as well as Southern California areas served.

[8] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

[9] Dealer sales only for Spokane and company territory. Company sales not included. Table stoves, grills included with cookers.

‡ July figures were not available at time of going to press.

Span of Life

Facts about a drive which sold appliances from a new angle

The fact that the average span of human life is today longer than it was even ten years ago is readily accounted for. Everywhere men and women are working to make life safer, easier, more certain. Generally, the success of the endeavor is attributed to the medical, scientific or educational professions. But in many instances it is industry which has laid the groundwork. And in many of those many instances it is the electrical industry's service and appliances which should get the credit.

Realizing this, R. W. Clark, Puget Sound Power & Light Co. merchandise manager, several years ago set about devising a plan which would call public attention to the electrical industry's contributions. At first the plan was hazy. He knew that the program required the concerted effort of the whole industry; he knew one appliance could not be played up above the others; he knew that the negative idea that man's life span will be decreased without generous use of electrical appliances had to be guarded against. But gradually, with the aid of dealers, jobbers and manufacturers, he rounded the idea into working order.

Span of Life window display in the Seattle office of Puget Sound Power & Light

The plan evolved provided for apportionment of expenses and responsibilities among three separate groups: The utility assumed responsibility for coordinating the program, furnishing necessary materials and costs of a comprehensive introductory and promotion program, judging and distributing award certificates. Jobbers and manufacturers underwrote the $5,000 worth of prizes, awarded in the form of electrical merchandise. Dealers, who agreed to forego the profit on the merchandise selected from their stocks by the winning contestants, did the actual customer contact work and displayed and distributed the promotional material.

Called "The Span of Life Contest," the program was announced to the trade in the nineteen counties served by the company in central and western Washington on March 3, 1938. Two hundred and thirty-five dealers agreed to participate. Twenty manufacturers were willing to underwrite prizes which might be selected from 40 merchandise lines.

In preparation for the actual campaign period, the power company produced 100,000 official entry blanks, 1,500 window posters, 2,000 window cards, 1,000 counter and show-case cards, and 50,000 contest booklets. (More were printed later.) Teaser ads in 96 papers and radio programs announced the contest to the public.

One of the immediate objectives of this advertising was to build store traffic for retailers. To this end, prospective entrants were urged to call at their own dealer's store for entry blanks, suggestions, etc. All advertising was designed to convey the idea that the program was industry-wide in scope, but representatives of each participating merchandise line were asked to use their own ingenuity in capitalizing on the special health-stimulating features of their merchandise.

The general promotional material emphasized the broad advantages of electrical applications under such captions as "It's Thrifty to Be Healthy," "The Electrical Way Is the Modern Way." Publicity was given to the idea that with a single snap of a switch electrical energy rushes to do man's bidding at the rate of 186,000 mi. per sec. If all human services could be applied at comparable speed, the accumulated saving of time, worry and human energy would immeasurably increase man's span of life.

Contest rules required the submission of letters of not more than 200 words describing how some practical electrical appliance increases the span of life. Prizes might be applied on the purchase of appliances of greater dollar value than the prize, or they might be applied on purchases made during the 45-day contest period, May 15-June 30.

Letter entries in the contest began to arrive the first day of the campaign period. The volume increased steadily thereafter. To such an extent, in fact, that on the third day before the contest closed 100 letters arrived; on the second day, 200; on the final day, 400.

For judging purposes the territory was divided into six districts, each presided over by three persons not connected with the industry. After contest entries had been sorted, they were turned over to these judges for selection of the 82 winners in each district. The district first-prize winners were then judged for the three grand prizes of $300, $200 and $100.

Awards were made in the form of merchandise certificates over the signature of Pudget Sound Power & Light. These certificates could be taken to any cooperating dealer to be used for purchase or part payment on merchandise from a participating line. This method proved workable, and it offered the dealers an opportunity to sell up above the face value of the certificates.

As another immediate sales benefit of the program, provisions were made for insertion on the entry blanks of the names of the originating dealers. When returned, these blanks were used as live sales prospects.

Since the contest ended, letters submitted by the contestants have been catalogued in separate groups for the different appliances. These letters are to be still further analyzed and combined into a salesman's portfolio which will be made available to all campaign-participating electrical men.

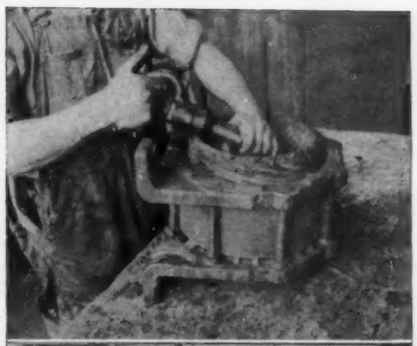
As carried out, the Span of Life activity is but the opening wedge in the attempt to tell the real health story of all electrical appliances. Proof that this attempt will bear fruit are the letters themselves. Appreciation of what the electrical industry has done to make life better is vividly portrayed in the sincere language of every letter-writer.

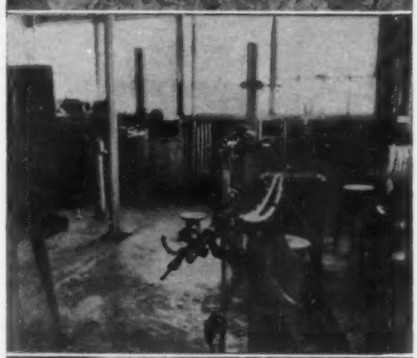
One entry serves as an example:

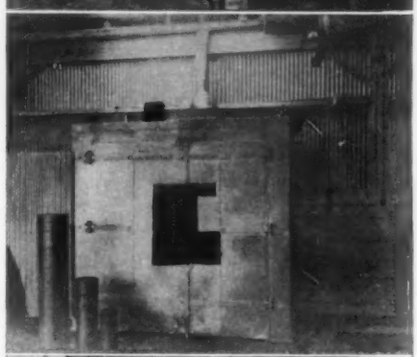
"A few months ago I went to visit a friend who lives out in the hills in another part of the state. Being one of those people who just has to read at night, I thought it might be a good idea to take my IES study lamp along, as, since purchasing it, I can't seem to read much without it.

"Upon my arrival I found my friend suffering from a very serious stomach disorder which, the doctor said, was being aggravated by a nervous strain brought on by continual headache. The doctor recommended an eye specialist who fitted her with glasses, but the trouble continued. The house was equipped with the old-fashioned drop-cord lights, and 40-watt lights were the largest in use. To make a long story short, after using my lamp in the room where we did most of our night reading, the headaches began to disappear, and with them the nervous condition. When I left some months later, in place of being on a liquid diet she was eating all kinds of fruits and vegetables, and her general health was much improved."

Streamlined Motor Repair







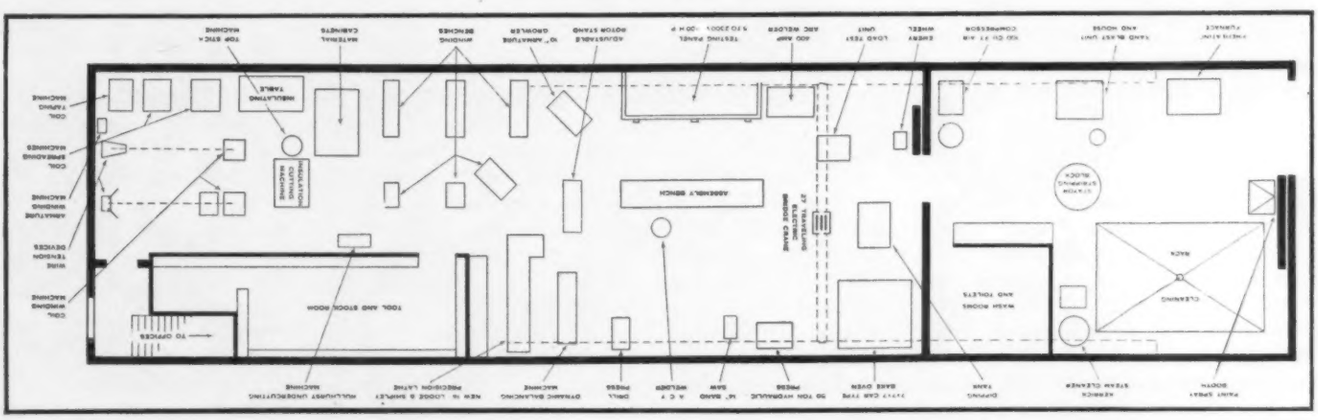
At left: Three shifts are worked in this well lighted streamlined repair shop. At right: First step in the rewind job is to cut coils with an air chisel, then put the stator in an oven to loosen them. Below is the winding department, machines arranged in sequence to handle coils in a continuous line production method. As the stripping and cleaning of the stator and armature are being done at one end of the shop, new coils are fashioned, taped, and then inserted on the winding benches

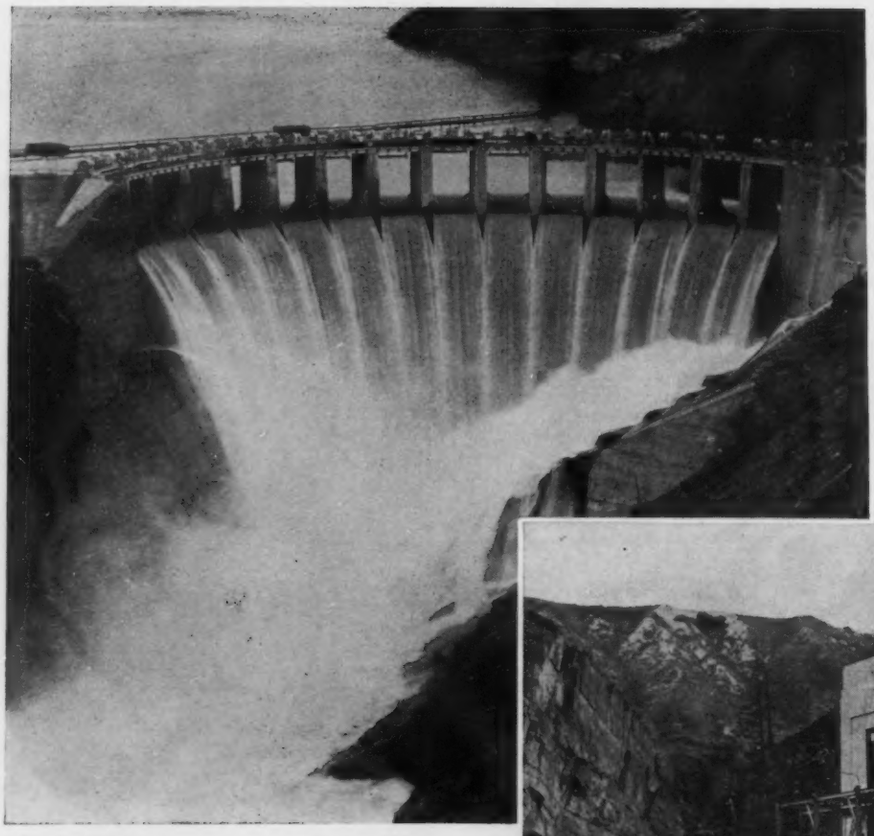
BY avoiding every sideline not directly related to motors and electrical maintenance the R. A. Reed Electric Co., located in a long corrugated-iron, line-production type of plant at 5503 So. Boyle Ave., Los Angeles, has developed an unbelievable speed in the complete rewinding of motors. This speed is important to the oil field and industrial clientele which it serves. Motors of from 1- to 30-hp., 2- to 12-pole, can be delivered completely rewound, twice dipped and baked, Glyptal sprayed, dynamically balanced and tested in 16 hr. Motors up to 200-hp. have been finished in 48 hr., and a 1250-hp. motor was rewound and delivered in 9 days.

In organizing the plant to deliver a high grade job in minimum time, Mr. Reed has studied every motion, sought to simplify methods, provided the most effective tools and equipment, arranged his shifts to carry on continuous production and is constantly on the lookout for still better methods and ideas. When he finds a method idea in one of the electrical magazines he gives it a thorough test. "I try it long enough to find out whether it really will save time or not," he says. "Many shops try an idea a couple of times and then, because they are green at it, do not get the results they expect. We keep on trying."

Most pronounced time savings have been made in methods used to strip a motor brought in for rewinding. First it is checked by the foreman—bearings, terminal box, wire sizes, connections, etc. The end bells are removed, armature taken out and steam cleaned. Stator coils are cut with an air chisel. The stator is heated to 350 deg. F. which loosens the coils and they are drawn out easily. The stator is sandblasted for quick, effective cleaning. Ordinarily a day's work, these operations on a 1- to 30-hp. motor are finished in 1½ hr. and the stator is ready for the new coils that have been made up meanwhile on a gang winder.

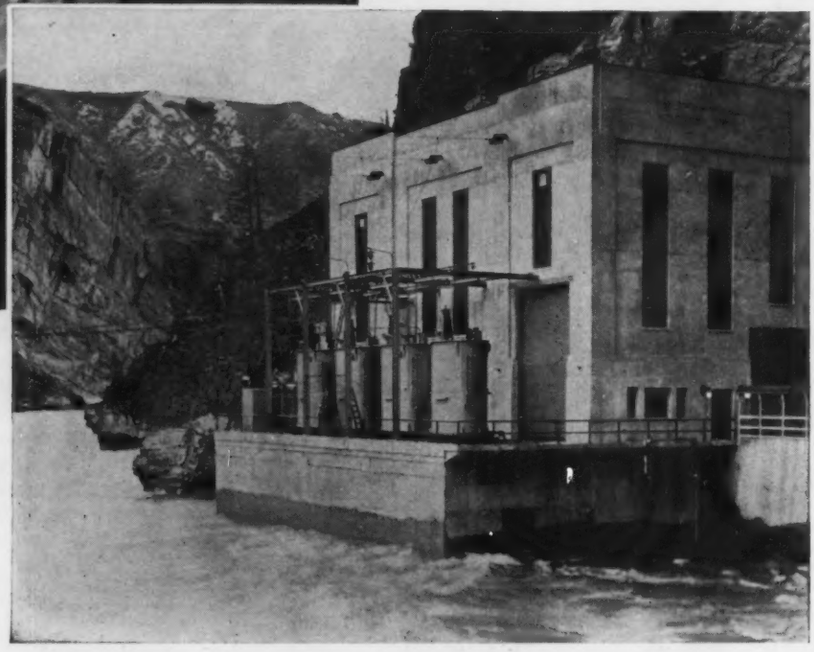
At right, third, the 26-kw. bake oven, with thermostatic and humidity control. Standing in front of it are three of the long thin stators for submersible pump motors, which are wound in this plant. Next are seen the "industrial analyzer" and other portable and recording instruments and meters with which to check customers' equipment in operation. Below: A floor plan which shows the "flow-sheet" way in which the plant is laid out to provide speedy yet thorough rebuilding of motors





New Capacity For Montana

By H. H. COCHRANE, Chief Engineer
The Montana Power Co., Butte



FLATHEAD LAKE in western Montana is one of the largest natural bodies of fresh water in the U. S. It has long been looked upon as an ideal storage reservoir for power purposes, but not until recent years has development been warranted by the market for power.

Five miles below the outlet of the lake, Flathead River flows through a narrow and crooked canyon with rock walls over 300 ft. high. It is at this point that the Frank M. Kerr hydroelectric project was dedicated last month by Montana Power Co.

The development consists of an arch dam 200 ft. high, intake works immediately adjacent to the left end of the dam, penstock tunnel 800 ft. long and powerhouse backed up against the cliff at the tunnel's lower end.

One 56,000-kw. unit is installed at present and provision has been made for a duplicate unit to complete development.

Hydraulics

Flathead Lake has an area of 172 sq. mi. The Flathead River runs in at the north end and out the south. During the seasonal flood period, usually in June, the lake commonly rises to an elevation of 2,893 and in extreme cases to 2,896 ft. or higher. Normal low is at elevation 2,881 or thereabouts. Under terms of Montana Power's license from the Federal Power Commission, the lake may be regulated for power purposes between elevation 2,883 and 2,893. This 10 ft. provides a storage of 1,100,000 acre-ft., which is sufficient to increase the natural minimum flow from 1,500 to 5,400 sec.-ft.

The dam serves the double purpose of providing head and regulating flow. To accomplish the latter, the top of the dam was established at elevation 2,900, slightly higher than the maximum lake elevation. To provide for wasting water during flood period, the dam is topped with 14 spillway openings, each 21 ft. wide by 27 ft. deep. Each opening is provided with a vertical drop gate, which in the open position is suspended below the opening, on the upstream face of the dam. The top of the gate, which forms the spillway lip, can be adjusted to any desired elevation to control the amount of spill. During floods the gates will ordinarily be set at the same elevation so that the spill will be uniform across the entire length of the dam.

Fitted with wheels to reduce friction, the gates are raised and lowered by individual hoists rated at 75 tons, and are operated by 15-hp. motors through reduction gearing which gives a gate speed of 8 in. per min.

Flow through the penstock tunnel is controlled by a motor-operated Broome roller gate. The tunnel is horse-shoe shaped with cross section equivalent to a 24-ft. circle. Driven in hard rock throughout its length, it is lined with concrete. At the upper end, the lining is reinforced for a short distance down from the headworks. At the lower end, connection is made to the spiral casing of the turbine by a thimble 20 ft. in diam. constructed of 1-in. steel plate extending into the tunnel 100 ft.

Generating Unit

The turbine, rated 77,000 hp. at 189-ft. head, 112.5 r.p.m., was built by Newport News Shipbuilding and Dry

Dock Co. It is controlled by a Woodward governor, fly balls of which are driven by a synchronous motor taking current from a small permanent-magnet generator atop the generator shaft.

Built by Westinghouse, the generator is of umbrella type, with combined Kingsbury thrust and guide bearing submerged in oil. Rather than being circulated outside the bearing housing, the oil is cooled within by submerged water-cooling coils.

The generator is totally enclosed. Ventilating air is recirculated and water-cooled by means of fin-tube heat exchangers, located at four points symmetrically spaced about the generator frame. This arrangement of coolers results in the outside casing of the generator's being square in plan, with rounded corners, a plan which utilizes to best advantage the limited floor space.

Space economy is also attained by the design of the exciting unit. The pilot exciter is telescoped within the main exciter, and the generator slip rings are located immediately above the pilot-exciter armature, so that the entire assembly projects only 29 in. above the generator cover plate.

Unusual is the fact that this unit is a duplicate of the generating units at Norris Dam. Rarely are there two hydroelectric developments as large as these in which both head and capacity are so nearly the same that duplicate generating units can be installed.

Transformers

Installed outdoors on an extension of the powerhouse foundation over the draft tubes are three single-phase transformers and a spare. Two more will be added when the second unit is installed. The bank of three, built by General Electric, is rated 56,000-kva., 13.200 volts delta to 115,000 volts Y, and will operate with grounded neutral. They are water cooled. Each is mounted on wheels and can be moved into the powerhouse, under the crane, for repairs. On account of their height, a hatchway is provided in the powerhouse floor so that a transformer can be untanked by lowering into the basement.

Powerhouse, Switchyard

Site of the powerhouse is a point immediately below the last of the natural rapids downstream from the dam. Here the distance from intake works to natural tail water is a minimum. Unfortunately, this site was so inaccessible that it could be reached only by a boat and provided no room whatever for a powerhouse because it was on the side of a rock cliff which made an angle of about 25 deg. with the vertical and extended several hundred feet up, and nearly 100 ft. down, from the water surface.

To overcome the first difficulty and lay a railroad track to the site, it was necessary to build 400 ft. of trestle, 90 ft. of tunnel, a steel girder bridge 100 ft. long and finally an arched retaining wall 45 ft. high. To overcome the second difficulty, the entire powerhouse area had to be blasted out of the cliff, an excavation requiring the removal of 30,000 cu. yd. of rock.

The building is of steel frame construction with concrete walls and roof. As protection against falling rocks from the adjacent high cliff, the concrete roof slab is 12 in. thick and is covered with a 2-ft. layer of coarse gravel.

Present superstructure is sufficient only for the first generating unit, but foundation and draft tube are in place for the second so that future installation will not require lowering water in the tail race.

Because of space limitations at the powerhouse site, the 110-kv. switchyard is located 1,800 ft. downstream, where the canyon widens into an area of comparatively level ground.

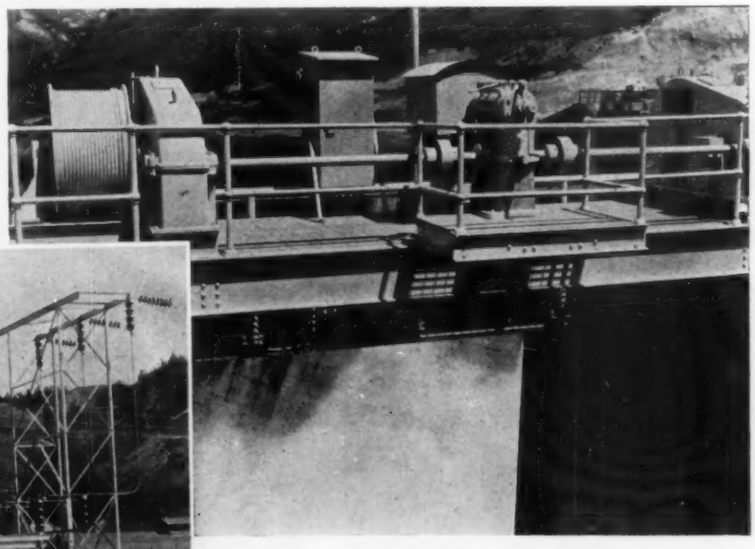
The switchyard is laid out with a single bus and four switch bays. In two bays oil circuit breakers are installed, one controlling a line running south and east 145 mi. to Anaconda, and the other a line running west 57 mi. to Thompson Falls. Lines running west from Thompson Falls connect with Washington Water Power Co., and at Anaconda connection is made to Montana Power Co.

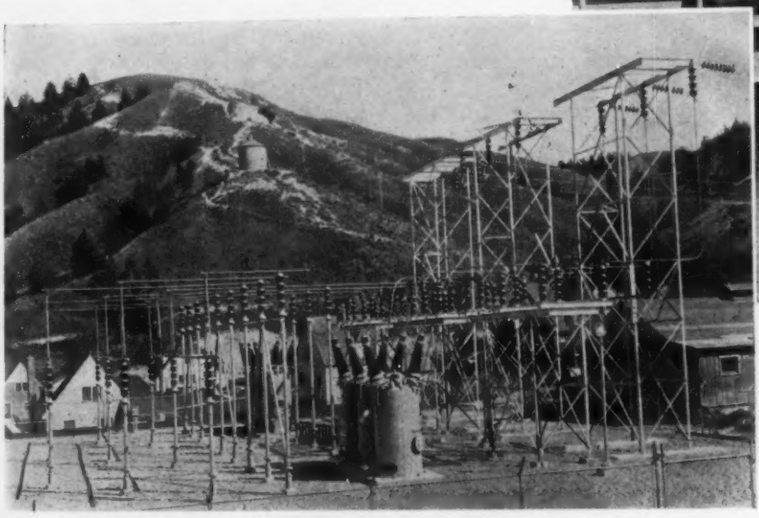
The two lines, therefore, form a substantial tie between these two major systems and allow power from the Flathead plant to be transmitted either east or west or in both directions, as requirements may dictate.

In the third bay of the switchyard an air break switch is installed connecting to the present unit in the plant. A similar switch will be installed in the fourth bay for the second unit.

The line to Anaconda is designed and insulated for 154 kv., but is operated at present at 110 kv. Voltage will not be raised until the second unit is installed, at which time auto transformers will be put in at both ends of the line to raise the voltage from 110 to 154 kv.

Circuit breakers in the switchyard are operated from the control room in the powerhouse by control cables installed in underground conduit.





Opposite page, at top, the Flathead River pouring through all 14 spillways which top the Kerr project dam. Opposite page, at right, is the powerhouse, where one 77,000-hp. unit, half ultimate, is installed. This page, at left, is the switchboard, 1,800 ft. downstream from the powerhouse. Above is one of the gate-lowering mechanisms. Gates drop down the upsteam damface

Fig. 1—Plate-type water rheostat. Tests proved this rheostat unsatisfactory

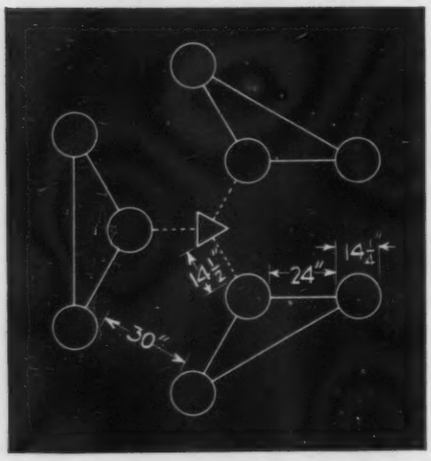
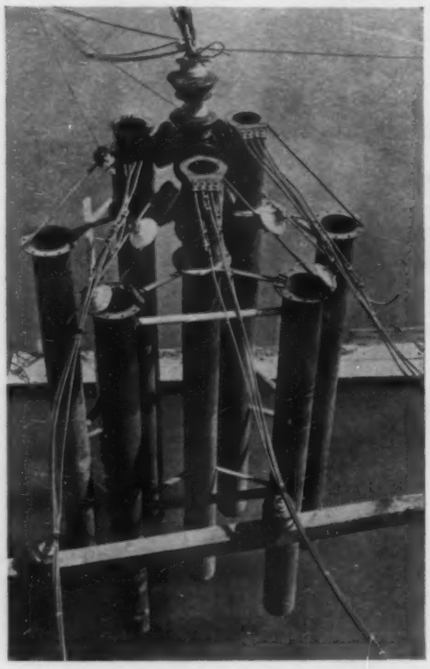


Fig. 2—(above) Electrode arrangement and spacing of the rheostat shown below
Fig. 3—(below) Nine-electrode rheostat developed for testing main units at Bonneville



Water Rheostat Is Test Load for Bonneville

Demands up to 60,000 kw. placed on main units by nine-electrode unit. Studies show nature of current density determinants

By RICHARD LaHUE EARNHEART
Corps of Engineers, U. S. Army
Bonneville, Oregon

SPECIFICATIONS for generators and turbines at Bonneville power plant required extensive tests on all machines prior to final acceptance. Load was to be supplied by the government.

No commercial load was available at the time, and even had it been available, it probably would have been impractical for the tests specified. Governor adjustment tests, for instance, required a load which could be dropped or picked up merely by operation of an oil circuit breaker.

Required was a variable load up to 60,000 kw. for purposes of testing the initial installation. This consisted of two main units, each generator being rated: 43,200 kw. at 0.9 p.f., 13,800 volts, and a station service unit, its generator rated 4,000 kw. at 0.9 p.f., 2,400 volts.

Initial Attempt

These conditions led to decision to construct a water rheostat, a job which was complicated by the unusually high resistivity of water in the Columbia River.

Fig. 1 shows the first tried—a rheostat consisting of four 4x12-ft., ¼-in. steel plates with stiffening flanges on all edges. Separation was by pedestal insulators, 14½ in. high.

In an attempt to load the station service unit, plate spacing was increased to 25 in., but the rheostat proved unsatisfactory as the flanged edges of the large plates afforded so much area that full load of the generator was absorbed at 1-in. immersion. Severe arcing and heating occurred at the electrode surfaces. These tests were run at 13,800 volts, the station service unit being connected through its transformer bank.

In these first trials, phase balance was not good, so later trials were made with the plate rheostat on one of the main units to determine the exact phase currents. Table I gives these data. During this test the heat did not get away from the plates, and as a result there was considerable boiling and steaming. The rheostat did not flash over, although it did arc and spit, especially after the water between the plates reached the boiling point.

Plates Prove Unsatisfactory

Data taken on the plate rheostat indicated that a drastic change in design was needed and that the characteristics of a water rheostat are hard to predict. The unbalanced phase current indicated that a symmetrical arrangement of electrodes was desirable.

This was accomplished by fabricating two equilaterally triangular boxes upon which the supporting and spacing insulators were mounted to carry iron pipe electrodes. In this manner insulated supports were provided at 120-deg. intervals for the three electrodes. The insulators were of the pedestal type, 14½ in. high.

Fig. 4 shows characteristic curves determined by actual readings on the three-electrode rheostat evolved for station-service-unit tests.

The first trial was made with two insulator units per stack, and 2½-in. conduit for electrodes. This construction

did not permit sufficient electrode immersion to adjust for the smaller loads. Another insulator was assembled in each stack, making the spacing approximately 80 in. This helped somewhat but not as much as was anticipated. Accordingly, the 2½-in. conduit was extended with 5 ft. of 1-in. conduit. Maximum load was carried on the 1-in. electrodes with about 4½ ft. immersion, as shown in Fig. 4.

Operation of this rheostat was satisfactory, although the high current densities resulting from small diameter electrodes caused considerable arcing. This rheostat flashed over once when an attempt was made to carry a small load at about 2-in. immersion.

A piece of ⅛-in. pipe 1 ft. long was added to the bottom of each 1-in. electrode in an attempt to carry the smaller loads. This scheme worked reasonably well and was used for the light load runs, but the current density was so high that arcing was practically continuous. A ball of fire formed at the point of the electrode under water in a way similar to the forming of corona on a point under high voltage stress. Excessive spitting occurred continuously at the water surface.

During a night run with the 1-in. electrodes, under-water discharges could be observed at frequent intervals from one electrode to another. These were red flashes in the water between first one pair of electrodes and then another. No indication of this was noticeable on the test instruments.

The rheostat was suspended in front of the station service intake, it being hoped that flow into the station service unit would cool the apparatus. However, such was not the case at high forebay levels. Hot water accumulated at the surface and was not affected by the deeper flow into the station service intake. At very low levels, the effect of the flow into the station service unit was helpful.

Testing schedule for the main units required a maximum load of approximately 60,000 kw. The rheostat that was finally evolved to handle this load is illustrated in Figs. 2 and 3, and its characteristics are shown in Fig. 5.

Big 3-electrode Unit

From data obtained on the small rheostat estimates of current density were made and used to design a large three electrode rheostat. For electrodes, 14-in. pipe was used, because a quantity of such was on hand. It had been fabricated from ⅛-in. sheet steel to an outside diameter of 14¼ in. Estimated current density indicated that three 14-in. electrodes, 9 ft. 6 in. long would carry sufficient load. Accordingly, a rheostat was assembled with four insulators per stack on the same triangular boxes as were used on the small rheostat. Three sections of the 14-in. pipe, each 3 ft. long, were reinforced with a ½x4x4-in. angle on the inside and a ½x4-in. bar on the outside. The ends were welded to the pipe flange at bottom and to the terminal flange at top. The reinforcing pieces were drilled to fit the tops of the spacer insulators, to which they were bolted with cap screws. This arrangement provided a very rigid framework to which the flanged ends of the electrodes were bolted.

Currents Below Estimate

Test runs were made on the apparatus with the results shown in Table II. Estimated current densities proved erroneous, actual densities being much lower.

The electrode spacing was then reduced by removing one insulator unit from each stack. Table III gives the data obtained from tests using this arrangement. The increase in load was so very slight it was decided to use one insulator per stack, giving approximately 30-in. spacing between electrode surfaces. Greater spacings had been used first because of fear of flashovers, but experience showed this fear to be groundless. In operation the electrodes at the minimum spacing showed no spitting or tendency to arc.

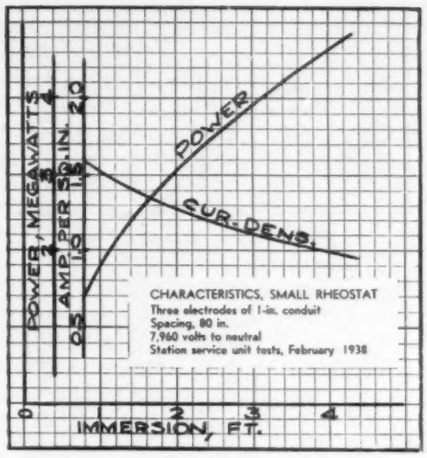
Table IV shows the results obtained with one spacing insulator. At least twice as much capacity was required as was obtainable with full immersion. Doubling the capacity would have required considerably more than twice as much immersion, and head room was not available for increasing the electrode lengths to any such proportions. It was then decided to try three electrodes for each phase, a total of nine. Fig. 2 shows the arrangement and spacing.

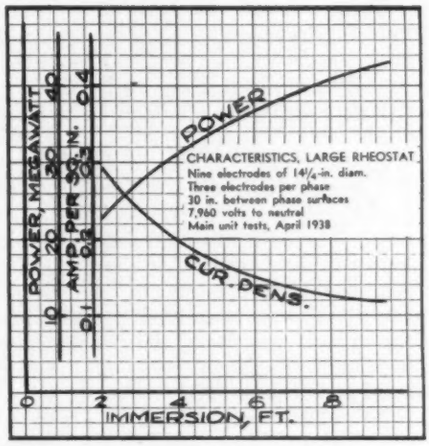
Electrodes Increased

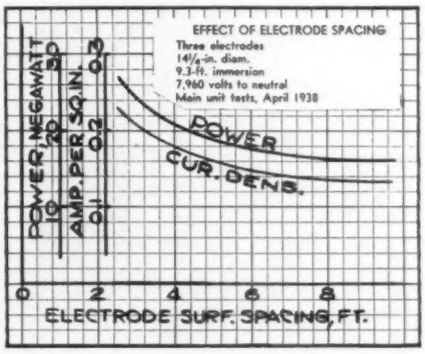
Two extra electrodes were attached to each of the original three by welding spacers and braces between them. Each of the nine electrodes was lengthened 5 ft. 6 in., making the total electrode length below the flanges 15 ft.

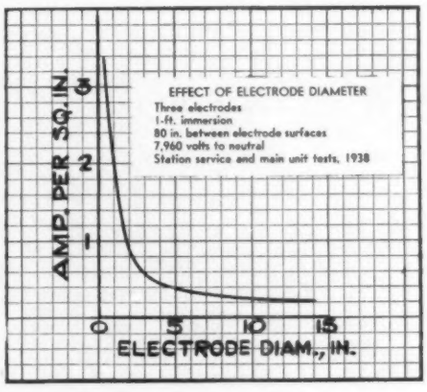
This rheostat, characteristics of which are shown in Fig. 5, proved very satisfactory. The load was well balanced, very steady and easily controlled. Cooling was brought about by the water running at relatively high velocity into the main unit intakes. At smaller loads there was a slight amount of steaming because of reduced flow, but at heavier loads there was none.

With 30-in. spacing this rheostat flashed over once, when an attempt was made to carry too small a load by reducing immersion—about 6 in. After









(Top to bottom) Figs. 4, 5, 6, 7

Table I—Four-Plate Water Rheostat

Plates 4 ft. wide, spaced 25 in., 2-ft. immersion, B phase outside

VOLTS						
Phase A-B	Phase B-C	Phase C-A	Phase A	Phase B	Phase C	Power kw.
13,680	12,960	13,200	825	925	650	19,800
13,560	12,960	13,320	850	950	650	20,580

Table II—Three-Electrode Rheostat

14-in. electrodes, 9.8 ft. between surfaces

Immersion ft.	Power kw.	Current Density amp. per sq. in.
4	8,000	0.155
8	14,000	...
9.3	16,000	0.134

that, immersion was never reduced to less than 18 in. with full voltage applied. Smaller loads, down to 7,000 kw. were required only for turbine tests where it was possible to reduce the applied voltage.

Physical Connections

Turbine tests required raising and lowering forebay level approximately 30 ft. to get various heads. This necessitated flexible rigging to handle the rheostat; a boom and hand hoist were used.

In order to get power to the rheostat a line was built over the transformer banks and across the roof of the office area. There it was tied into a cable loop arranged to provide the flexibility required with changes in lake level. The line was connected to the bus through risers from the transformer terminals. Each conductor of the line consisted of four 300,000-circ. mil, hollow-conductor cables and was carried on single-unit, suspension-type insulators. Spacing was 3 ft. over the transformer vaults and 6 ft. in the cable loop. The crossarm in the middle of the loop was so arranged that it could be adjusted up and down by operating a hand hoist, thus keeping proper sag in the short loop.

Connection to the rheostat electrode was made with solderless connectors bolted directly to the ½-in. steel terminal flanges. This is quite clear in Fig. 3. No excessive heating or trouble of any kind was experienced with these connections even with loads in excess of 2,000 amp.

The pull of the cable loop caused the rheostat to tip slightly one way or the other at various elevations, resulting in an unbalanced load. To correct this, the guy cables were arranged with a set of blocks and a hand hoist.

Dr. F. O. McMillan, professor of electrical engineering at Oregon State College, has made extensive studies of the resistivity of the waters of the Columbia River and its tributaries. The results of these studies are published under the title "Electric Fish Screens", Bulletin of the Bureau of Fisheries, Volume XXIV, year 1928, Document No. 1042. Data in this publication indicate that the resistivity of Columbia River water at Bonneville is 3,620 ohms per in.-cube at 45 deg. F., but that as temperature rises resistivity falls rapidly. At 80 deg., the resistivity is only 2,200 ohms per in.-cube.

One might think from this that as the water temperature rises pronounced changes would take place in the immersion required. Experience indicated, however, that with the spacings used this was not the case. One test was run on the station service unit in which the surface water scarcely moved at all. During this run the water around the rheostat became so warm that great clouds of steam were given off, so that at times the rheostat could not be seen from above. It was estimated that water temperature 5 ft. from the rheostat was 150 deg. Even under these drastic changes in temperature, practically no change in load took place for a given immersion. Perhaps this interesting phenomenon is related to the fact that after the distance between electrodes reaches about 6 ft. there is apparently very little reduction in current density even though the spacing be further increased. This can be seen in Fig. 6.

Current Paths

Paths taken by the current in passing from one electrode to another fan out in innumerable planes below the water surface in much the same manner that magnetic lines of force pass from one pole to another. Extent of these paths is indicated by tests made at Bonneville with a vacuum-tube voltmeter. Readings indicated that maximum horizontal potential 20 ft. from the rheostat was approximately 4 volts per in. and maximum vertical potential 0.5 volt per in. A conception of the field of these current paths, which radiate in three dimensions, explains the fact that current density is higher at low immersions of the electrodes than at greater immersions, as may be seen in Figs. 4 and 5. As the immersion increases the current paths that radiate down from the electrodes become a smaller proportion of the total number of paths.

Effect of Electrode Size

Experiments on the two rheostats also provided data for Fig. 7, which shows how current density varies with electrode size. Obviously this curve is useful only for the given conditions. However, were the conditions changed, the shape of the curve would no doubt be similar though the coordinates values would be shifted.

The generators at Bonneville have wye-connected windings. All tests were run with the neutral breaker open, but in order to determine the ground current from the rheostat, one run was made on Unit No. 2 with the neutral breaker closed. Table V gives the results. Phase currents were very closely balanced, and ground current was relatively low.

The rheostats were designed and developed by L. T. Fisher, assistant engineer; Frank M. Lewis, engineer; Lloyd P. Joubert, engineer, and myself, all of the Corps of Engineers, U. S. Army. Major Theron D. Weaver is district engineer of the Bonneville District.

Table III—Three-Electrode Rheostat

14-in. electrodes, 6.6 ft. between surfaces

Immersion ft.	Volts	Power kw.	Phase Amperes	Current Density amp. per sq. in.
2	13,800	5,000	209	0.195
9.3	13,800	17,000	710	0.142
9.3	15,000	20,000	780	0.156

Table IV—Three-Electrode Rheostat

14-in. electrodes, 2.5 ft. between surfaces

Immersion ft.	Volts	Power kw.	Phase Amperes	Current Density amp. per sq. in.
4	13,800	13,000	544	0.252
9.1	13,800	27,000	1,130	0.230

Table V—Nine-Electrode Rheostat

Neutral breaker closed, 7,960 volts to neutral

Power kw.	Amperes			
	A-phase	B-phase	C-phase	Neutral
15,000	605	600	600	Low
23,000	860	860	840	40
28,000	1,115	1,122	1,105	40
40,000	1,585	1,580	1,555	60

Los Angeles Bureau of Power & Light engineers line up at the AIEE convention. Left to right: Bradley Cozzens, L. L. Draper, W. S. Peterson and J. D. Laughlin

AIEE Attracts 450 To Portland Meeting

Top, left to right: A. W. Copley, Westinghouse Pacific Coast engineering manager, told of the development of the atom smasher; hosts to the Portland meeting were Don Smith of Pac. Tel. & Tel. and E. F. Pierson, Pacific Power & Light Co.; Tom Wood of Seattle won the Fisken Cup in the golf tournament. Bottom, left to right: Portland General Electric Co. Vice-President O. B. Coldwell; H. H. Henline, AIEE national secretary, and President John C. Parker; L. T. Merwin, Northwestern Electric Co. president

RAW meat of field experience was the banquet dished up to a record group of 450 who attended the annual Pacific Coast convention, AIEE, at Portland, Aug. 12-16. In addition to its thoroughly practical aspects, the program was distinguished by: first, its diversity, and second, a full-session symposium by Los Angeles Bureau of Power & Light engineers on operation of their 287.5-kv. transmission line from Boulder Dam.

Recognition by engineers of what their work means to society was urged by President John C. Parker in his opening address, "Engineering Orientation." Questioning the probability of engineers reaping the benefits claimed for registration and licensing, he said:

"Most electrical engineers are in the employ of industry, and this established their capability and compensation. At best, registration and licensing set only a minimum level, and we cannot expect legislation on these matters to raise either compensation or public esteem for the profession.

"In the last analysis an engineer's work must enhance both the social and economic status of society. Mere mechanical excellence is not enough."

Boulder Line

Participating in the Los Angeles Bureau's program on high voltage transmission were W. S. Peterson, transmission engineer; Bradley Cozzens, high-voltage research engineer; J. D. Laughlin, junior electrical engineer, and L. L. Draper, assistant protective relay engineer, all of the Bureau. Their contribution was a forthright discussion of the year and a half during which the Boulder Dam line has been operated.

Despite the fact that this period was spotted with lightning, sleet, floods and winds, the line operated ten successive months without interruption and has developed but five outages since it was placed in service—four attributable to the human element plus the functioning of control equipment, the fifth to floods which washed out sections of both circuits.

During one interruption, voltage at the receiving end rose to 375 kv. for 4 sec. and frequency to 65 cycles. Check of operating stability has not been obtained because of the speed with which relays and circuit breakers act. However, during a month when the line carried maximum load, transmission efficiency, including equipment at both ends (and the synchronous condensers), was 93.8 per cent.

Corona phenomena, contrary to accepted theories on the effect of altitude, barometric pressure, temperature and humidity were reported by Cozzens. In general, he said, low noise levels have

indicated the adequacy of the original design. But in desert regions losses have been higher than predicted. These indicated that accepted corona loss curves probably should be shifted upward 40 to 50 kv. for the particular conditions. Studies are under way on desert test sections, preparatory to construction of the Bureau's third Boulder circuit.

Adequacy of both insulation and lightning protection have been demonstrated by actual performance. Examination of the gap-type connectors between the towers and the buried counterpoise revealed that the line has been subjected to 173 direct lightning strokes without flashover. Burns on these gaps indicate stroke currents in excess of 200,000 amp. Five hits have been recorded with current values ranging from 35,000 to 120,000 amps. As high as twelve towers have been involved in a single stroke. For purposes of further study, magnetic, link-type, surge-crest ammeters have been installed on 23 mi. of towers in the region of high lightning incidence, and a lightning rod assembly has been placed on 80 towers.

Neither fog nor dust have caused any flashovers.

Carrier Operation Pictured

Eleven carrier channels ranging between 50 and 150 kilocycles have been provided. Draper described the functions of the eight which are in use—one for communication, one for supervisory control and six for relaying. The 60-kilocycle supervisory carrier gives the Boulder power plant operator control over four circuit breakers, eight disconnects and four ground switches at both the Victorville and Silver Lake switching stations as well as a continuous visual indication of the position of all this equipment and similar apparatus at the Los Angeles receiving station.

Only difficulty encountered was extraneous 60-kilocycle components due to lightning, arcing and line transients. These caused the relays to function. Because the interference signals contain other frequencies above and below 60 kilocycles, it was possible to design another circuit which would detect these multiple frequency currents and by increasing the bias on the 60-kilocycle tube, eliminate the possibility of faulty relay operation.

Both the carrier-current pilot protection and the high-speed current balance protection as described by Draper have functioned without serious difficulty despite abnormal service. One of the 60 vacuum tubes failed after a year of operation. Some overheating of the copper-oxide rectifiers occurred, necessitating a change to a newer design having 28-per-cent more plates and an externally mounted resistor. Several line wave traps have failed due to flashover of variable condenser plates. The latter were replaced with a small variable inductance in series with a group of fixed condensers. Transient currents, due to switching, caused some trouble with the balance current ground relays. This was eliminated by increasing the minimum pickup from 1 to 2 amp.

High winds at one section of the line necessitated developing non-sliding hardware for insulators, conductor and ground wire.

Rail electrification on the San Francisco-Oakland bridge, accommodating 50,000,000 passengers annually with 75-sec. train headway, was described by W. P. Monroe, consulting engineer.

Hydro Trends

Trends in electrical equipment for hydro plants were outlined by C. C. Welchel, General Electric Co. He emphasized: semi-outdoor stations, waterproof generator compartments, closed ventilation, return to direct-connected exciters, elimination of low-voltage breakers and buses, factory-assembled metal-clad switchgear, bus differential protection, 3-phase high-voltage transformers, Petersen coils.

Possible applications for copper oxide rectifiers were discussed by E. W. Morris, Westinghouse. He mentioned voltage regulation on alternators, mitigation of electrolysis on buried pipelines and selective relay operation on polarized circuits.

C. F. Wagner, Westinghouse, showed how an induction motor with capacitor for power factor correction may become a self-exciting generator.

At a session on basic sciences and measurements, G. R. Shuck, University of Washington, announced the development of a variable register watt-hour meter, speed of which could be adjusted to daily variations in the load curve thus introducing the law of supply and demand into energy measurement.

Design and control of the large motors used for pumping on the Metropolitan Aqueduct in southern California were described in a paper by J. C. Gaylord of the Water District. J. A. M. Lyon, Saginaw, Mich., outlined a method of analysis and calculation of zero sequence electrostatic unbalance of transmission lines to neutral which permits satisfactory application of Petersen coils through the installation of impedors, grounding transformers and neutral reactors where unbalance occurs.

On the program were a joint session with the Institute of Radio Engineers, on communication problems, and an excellent series of student meetings. Entertainment included a golf tournament, inspection trips to the Bonneville and Ariel hydro projects and a "speechless" banquet.

Not Plotted

You yourself, or another fellow in your plant or crew or office, probably have a better tale to tell than this. If it's something that really happened, and if it treads on no one's toes, send it to ELECTRICAL WEST. That's what this "Not Plotted" column's for.

Smith belongs to that distinguished company of engineering salesmen who make their living disposing of insulators. There are those who refer to the process as "sellng insulators," but Smith prefers it otherwise, supporting his preference with the following evidence

● ●

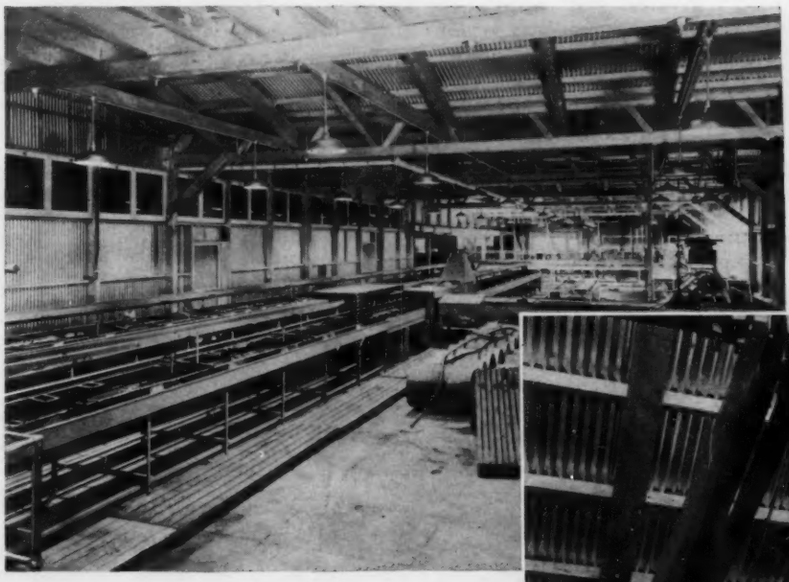
For hours Smith had been sitting in that office, working on that prospect, one of the toughest he had ever met. "This is a fine insulator you have," the prospect said, and he picked up the sample on his desk, "but it isn't rugged. Now this one," and he picked up a competitor's sample, "is built to stand up." Smith had been round this bush several times in the past hour, and he had scratched bottom in his bag of tricks. In desperation he cried, "All right, throw 'em out the window." Without a word, the tough guy picked up two of the samples, stepped to the open window, and tossed them out. A second's silence, then a terrific crash. When they looked out, there on the pavement two stories below was Smith's insulator intact, his competitor's shattered. "I don't believe it," said the prospect. Smith already had the bull by one horn. He decided to get a firm hold on two. "Try it again," he hissed. He did. Same result. The tough guy slumped into his chair and whispered, "You win. I'll buy." Sometimes Smith thinks it's because his insulators just happened to land right. Other times he just wonders.

● ●

Then there was another day, spent with a prospect much less tough. Smith had been cloistered in his office for more than an hour. The not-so-tough guy had his pen practically poised over the order blank. Suddenly the door opened slightly, and through the crack rolled an insulator. It rolled across the floor, banged into a steel cabinet and came to rest, undamaged. "That," said the prospect, jumping to his feet and pointing at the intruding insulator, "is what I want." Yes, it was a competitor's. How it got there or who rolled it Smith has never found out.

● ●

When Smith wants to make himself feel really bad, he thinks about his friend Bill. Bill doesn't catch on to things. Except for business. He gets plenty of that. One day Bill came in with his chin hanging way down by his stomach. "Guess I'm fired," he said, "read this." He held out a telegram. Bill had closed the whale of an order a few days before, and the telegram was from his factory. Where, it asked, had Bill dug up the price at which he'd closed the order. Smith checked up. Bill had had the price correct, but it was subject to a 40-per-cent discount which Bill had simply overlooked. That's another thing that makes Smith wonder—how Bill does it.



Typical of a thoroughly engineered job provided by the Bureau for Architects on behalf of contractors and wholesalers is that in the modernization of and additions to the Old Mission Packing Corp. plant in San Diego, illustrated here. Left is a night view showing general lighting from 200-watt, S. & M. RLM aluminum reflectors, on 10-ft. centers. This provides 22 ft.-candles of illumination. Below: Over packing tables a deep bowl reflector, with 300-watt lamps on 8-ft. centers, develops 40 ft.-candles on the tables. Over sorting tables with bowl reflectors, lamped at 200-watts, 50 ft.-candles are produced by 5-ft. spacing

Engineering Plans

How the Biddle Trade Bureau's engineering service to architects benefits every branch of the electrical industry in San Diego

WHEN plans are not engineered, the entire industry suffers. Contractors particularly become victims of uncertainty and diverse interpretations, make mistakes in estimating, often seek to recover losses by substitutions or omissions and everybody is cheated.

To furnish engineering service to the small or medium sized job for which the architect employs no consulting electrical engineer, several plans are used in various territories.

But engineering service furnished cooperatively through the agency of a contractors' and wholesalers' association is unique. In San Diego, the Biddle Trade Bureau, which manages the affairs of both contractors' and wholesalers' associations, has been furnishing architects of that county with electrical engineering service on behalf of these two trade groups in the interest of cleaner competition and better electrical installation. Sam Weimer, manager of the Bureau, summarizes the benefits accruing to each branch of the industry from this service as follows:

"First, to the contractor it gives a complete, clear and concise set of plans and specifications on which to estimate. This not only saves time in figuring the job but also eliminates to a large extent the chiseling type of contractor who takes advantage of a loosely drawn specification to figure and install a sub-standard job. We also supervise the installation of the work during construction, which assures the contractor that the job will be installed exactly according to plans and specifications. This again handicaps the unethical contractor who will substitute materials and cut down on wire capacities specified when there is no proper supervision.

"The benefits to the wholesaler are obvious, of course, in that first quality lines of materials are specified and installed.

"The utility benefits first by the intelligent working out of service and transformer problems in advance of the actual installation, and second, by the installation of adequate service and feeder capacities to provide for future expansion, thus making it possible for the owner to install future current consuming equipment at minimum cost.

"Manufacturers of electrical supplies and equipment are benefited for the same reasons as the wholesalers. While we do not specify individual manufacturers unless especially requested to do so by the owner, we do definitely specify the grade and quality of each type of material that may be installed.

"Finally, the owner benefits most of all because of a trouble-free installation that lasts and is capable of growing with his needs for electric service."

California Electric Works, contractor for the job, found Architect Frank L. Hope Jr.'s plans definite, his specifications practical and simple. They covered "scope of work, materials, no substitutions, codes and ordinances, inspection, guarantee, extra work; the service (200 amp., 3 No. 4/0, 2½-in. conduit) branch circuit wiring (all No. 12 wire); special outlets, fixtures, fixture schedule, outlet boxes, switch outlets, receptacle outlets, flush switches and receptacles (types and styles specified)." Power wiring was completely remodeled and a new service, double the size of the former, installed. Extra capacity was specified by requiring that all conduit have capacity for at least one additional circuit. Receptacle outlets were on separate circuits, controlled from the Multibreaker panel. Below: Advertising sign lighted by three 500-watt floodlights

Portland Code

It's a strict but practical guide for contractors, wiremen, builders, architects, etc.

"Our aim has been to make the new Portland code a practical guide for the electrical contractor, wireman, builder and all others interested in electric wiring," said L. W. Going, chief electrical inspector of Portland, in explaining the developments to be found in the new code, now completed and in the final stages of adoption. "The rules providing for minimum branch circuit and feeder layouts, in all types of occupancies, are especially comprehensive, and are so worded and diagrammed as to be easy of interpretation. We want this new Portland code to be constructive rather than merely prohibitive."

Portland, pioneer in code development along adequacy lines and in the control of sales of appliances, goes considerably beyond National Electrical Code requirements. Its new code might be termed an amplified, yet simplified code; amplified in that the supplementary matter goes beyond present NE Code standards, simplified because the wording and arrangement of material make it more easily understood and quickly followed by the contractor or wireman on the job.

Aside from being a practical handbook of wiring design, the new code specifies practices which will lead to more adequate wiring in both the residential field and in commercial and industrial occupancies. So much material has been added over and above NEC requirements that it is not possible to give it here, even in skeleton form. A few features may be mentioned, however, as indicating the thoroughness with which Chief Electrical Inspector L. W. Going and his contractors' code committee have gone into the revision of their book of rules.

By Way of Example

In the matter of branch circuits for commercial occupancies, for instance, it is stated that those required for general illumination are not to be less than the number computed for the floor area, the load per circuit and the standard load. This *standard load* is then put down in a table applying to commercial and public buildings in which the occupancies are classed under 32 heads. Opposite each class, the standard load for general illumination is given in watts per square foot (ranging from one to four, depending on the class of occupancy). Then in a parallel column is carried the allowable square feet per appliance circuit, this being necessary because it is provided that the minimum number of cutouts at the panel board for receptable branch circuits shall be the number computed from the floor area per circuit. However, the contractor is not vexed with these computations. He turns to the table.

Take, for example, a one-story store, 100 x 100 ft. The total area is 10,000 sq. ft. The table shows that for such a store the minimum illumination watts per sq. ft. is two, making a total of 20,000 watts. At 115 volts, this calls for 174 amp. Based on No. 12 wire, this represents twelve 20-amp. lighting circuits, the initial loading being based on approximately two-thirds of the maximum rating of the circuit.

The table also shows that for this class of occupancy there shall be one appliance circuit per 2,000 sq. ft., making a total of 5, for which provision must be made at the panel board. Provision must also be made at the panel board for one electric sign circuit. Therefore, in less time than it takes to tell it, the contractor arrives at the number of circuits that must be figured on—in this example, 18.

Consult the Table

Further, it may be said that for computing the minimum number of branch circuits, the portion of total standard load to be supplied by any ungrounded wire of a branch circuit is specified in the following table, which amounts to approximately two-thirds of standard load as stated.

Branch circuit classification	Amps. per two-wire circuit
15 amp. circuit	10
20 " "	14
25 " "	18
35 " "	25
50 " "	35

In dwellings of more than 500 sq. ft., at least one 15-amp. branch circuit must be installed for each 10 amp. and fraction of total standard load. This standard load is 2 watts per square foot of total floor area of the building (one-family) or of apartment (multi-family), but not counting basements, attics or open porches. In addition, at least two 15-amp. branch circuits must be installed in the basement, one for lighting and one for fixed appliances such as oil burner and fan. If it is a multi-family dwelling, at least one 15-amp. branch circuit must be installed in stairways, halls and other public spaces for each 10 amp. or fraction of the total standard load.

Special lighting, such as cove or total indirect, where the wattage will exceed one watt per square foot of floor area to be lighted, calls for separate circuits. In connection with appliances, 20-amp. circuits are called for in dwellings for receptacle outlets in certain rooms. In determining the number of such circuits, the following minimum current demand per room is assumed, regardless of receptacle outlets, and the load per circuit shall not exceed 20 amp.

Kitchen and pantry together	10 amp.
Dining and breakfast room	10 "
Living room	10 "
Bathrooms	10 "
Space adjacent to laundry trays	10 "

The 20-amp. branch circuits must not supply outlets in rooms other than those specified above, nor do they include receptacle outlets which are a part of a lighting fixture. They do, however, include refrigerator outlet, wherever located.

Adequacy is evident in the requirements governing the number of receptacle outlets in the home. Such outlets in the living room, parlor, library, den, sunroom and bedroom shall be installed so as to provide that no point on the wall, as measured horizontally along the wall, will be more than 10 ft. distant from an outlet, as provided for in the 1937 NEC.

Again, an example may be taken for the determination of circuits. Suppose that it is a residence having a gross area of 2,300 sq. ft. This is the outside measurement of the house. At 2 watts per square foot for lighting, this amounts to 4,600 watts, and at 115 volts, 40 amp. With No. 14 wire, this calls for four 15-amp. circuits. As seen, two more are required for the basement. In addition, there are two 20-amp. circuits for the receptacle outlets in the kitchen and other rooms specified in the above table. This makes, all told, 8 circuits over and above those necessary for the heavy fixed appliances.

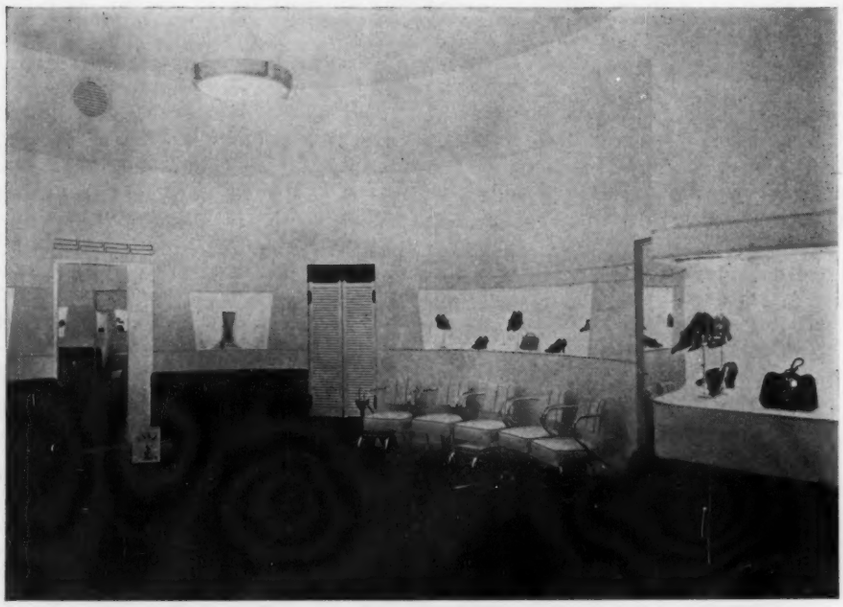
Range Wiring Rules

When installing range wiring, the contractor must make provision at the same time for an electric water heater of not less than 3,000 watts, including necessary conductors to meter and the necessary spare conduit capacity from meter to service equipment.

Thus it can be seen with half an eye that after the total load is computed, including lighting, small appliances and range and water heater, the average single family dwelling in Portland is going to require not less than a 3-wire No. 4 service, with 100-amp. switch capacity. In new buildings in course of erection, a conduit size must be installed sufficient to take care of the above load, which means 1¼-inch conduit. For single and two-family dwellings the minimum number of branch circuits is more than double that required by the 1937 NEC.

It may be added that the small portable appliance load is provided for in resident services with a view to securing adequate capacity for probable use of such appliances for some time to

Sales Up Because of Light



Murray Greenwood Shoe Store, Whittier, Calif., says that an important percentage of its sales are the result of its modern store lighting. Above is the store's central circular salon. Combined indirect and direct overhead lighting of pearl-grey walls provides a pleasing background for highlighted shadow-boxes. Set at eye-level in open recesses about the room are footwear displays. Under soft, well-rounded light, every merchandise quality is presented. Not a shoe-box is to be seen in the salon. Large stockrooms, lighted for quick and accurate selection, are behind the selling space

come. In single and two-family dwellings, the minimum small appliance load is taken at 1,000 watts for each 20-amp. receptable branch circuit, with a minimum total in single and two-family dwellings of 2,000 watts per dwelling. The computed load for domestic ranges shall be the sum of the specific loads to be served, except that given demand factors may be applied where there are one or more baking appliances individually rated at more than 1,650 watts. The standard load per range is taken at 8,000 watts (10,000-watt range), in single and two-family dwellings.

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Unspoiled Fish

How a San Francisco firm solved a difficult cold-storage problem

When Henshaw Refrigeration & Fixture Co., San Francisco Servel distributor, undertook to work out for Atlantic Fish Co., San Francisco, a method by which dry, salt fish could be stored without spoilage, engineers were confronted by one serious problem: How could the chilling unit in the freezer room be defrosted once a week without causing any appreciable change in the temperature of the room?

Hot-gas defrosting was the answer. Equipment consisted of a "humidraft", suspended from the ceiling of the freezer room (as well as the next-door ante-room); a spirally wound coil known as an "accumulator", and a "hot-line", a length of tubing which connects on one end to a line from compressor head to condenser and on the other end to a Tee placed between the outlet of the expansion valve and the inlet of the chilling unit.

In operation, when it is time to defrost, the chilling unit fan is disconnected and the hot-line shutoff valve, normally closed, is opened, thus allowing the hot gas from the compressor to enter the humidraft coil. An expansion valve then closes, acting as a check valve; the hot gas warms the chilling unit and the defrosting is accomplished in about 30 min.

The vaporized methyl chloride, which condenses in the defrosting operation, returns to the machine through the suction line; but being liquid or semi-liquid, it must be vaporized before it reaches the compressor. This process is accomplished by the accumulator.

Although this defrosting operation is manual, A. Henshaw, president of the firm, points out that it can be achieved by applying time control to the fan and to a solenoid valve. This would probably be necessary if the product stored was moist.

Shorts

High-frequency fields; traffic deaths; lighting forum, etc.

USE OF HIGH-FREQUENCY FIELDS beneath bar counters and behind signboards now makes possible lighting effects said to be superior to any employed at present. In a San Francisco cocktail lounge, hollow glass objects filled with Neon or other gases glow uncannily when brought near the counter. The same principle is also being applied by Lustron Lights, Inc., to changeable letter signs for theater marquees, etc. The letters light when they are slipped into grooves in proximity to the high-frequency field located behind the sign. Because no wiring connections are needed, safe handling of the letters is assured. It is also claimed that the system makes for a more attractive display because letters are lighted individually and unsightly cross-overs and double-backs are accordingly eliminated.

●

NIGHT TRAFFIC DEATHS along the 3.4-mi. stretch of U. S. Highway 91 leading into Salt Lake City have been reduced 85 per cent by use of sodium lights. Records one year after installation of the system, consisting of 96 luminaires with 10,000-lumen lamps, show but one night casualty. The previous year there were seven night casualties.

●

ADVANCED LIGHTING FORUM is being sponsored by the Western Institute of Light & Vision in conjunction with the Electrical Development League of Southern California. Sessions will be held in the Edison Auditorium, Los Angeles, Sept. 26, Oct. 3, 10, 17, 24 and 31.

●

ELECTRICAL LEAGUE of Utah and the Electric Club of Washington have received from the National Adequate Wiring Bureau licenses authorizing them to operate the certified adequate wiring program.

●

NATIONAL BETTER LIGHT-BETTER SIGHT Bureau is making available a series of rotogravure pictorials showing the advantages of good lighting. The series starts this month and continues—in three sections—through December.

●

STREET LIGHTING in Yakima, Wash., will be modernized under a ten-year contract between the city and Pacific Power & Light Co. The system will cost the company $60,000. Work will be extended over four years. When completed, 600 incandescent lamps will replace 220 arc lamps now in service.

Doing a Job

When the Northwest needs a rural line the utilities build one

By BERKELEY SNOW*
Executive Secretary
Northwest Electric Light & Power Assn.

For over 30 years the Northwestern private utility companies, in cooperation with many other individuals and organizations, have been engaged in bringing central station service to the rural areas of Idaho, Oregon and Washington. To date the result is over 200,000 users of central station service outside cities. Of this number, 96,000 classify as farms served on 21,500 mi. of rural distribution line.

Hood River Valley, Ore., claims to be the location of the first rural distribution line built in the U. S. to serve dirt farmers. This line, constructed by a predecessor of Pacific Power & Light Co. in 1906, was about 2 mi. long and served five customers. Other pioneers were Puget Sound Power & Light Co., which began to build farm lines in western Washington in 1909; Idaho Power Co., which began in southern Idaho about 1910; Mountain States Power Co., which began in the Willamette Valley, Ore., in 1911, and Portland General Electric Co., which began in rural areas round Portland in 1914.

An important element in this rural line growth has been the constructive attitude of the regulatory commissions of the three states. In the first decade of development from 1910 to 1920, utilities, through their studies of the cost of lines and the revenues derived from them, set up definite bases on which they could make uniform extensions throughout their territories without discriminating between groups of prospective customers. The state commissions soon recognized the desirability of such uniformity, and early in the 1920's they devised rules and regulations to apply in their respective states. These rules, which have been modified from time to time in the light of experience—but always in favor of the farmer—, have had a stabilizing influence tending to encourage the building of more rural lines and the contracting of more electrical business thereon.

Table I shows the growth of farm electrification in the three states over a 14-yr. period, 1923 to 1937, in 5-yr. steps. Fig. 1 is a graphic portrayal of this growth year by year. Fig. 2 plots the percentages of farms served, as shown in Table I. The dip between 1934 and 1935 on this chart was caused by increasing the denominator of the fractions making up the percentages, which is the total number of farms in each state. For all calculations previous to 1935, the total reported for 1930 is used. From 1935 on, the increased number reported for 1935 is used. If the increase in total farms between 1930 and 1935 had been pro-rated by years, the curves would have risen constantly though not so steeply during that period. Where the curve for the national percentage is dotted, no figure was available.

As a matter of interest, Washington is seventh among all states in percentage of farms served; Idaho is tenth, and Oregon, eleventh.

Table II lists the major private and municipal utilities, government and REA cooperatives serving any part of the three states and gives the number of their rural customers and the miles of line from which these customers are served. Although these figures are not of the same date, they are all recent. They are not, however, complete, since they omit a number of small companies and municipals. But a reasonable estimate is that they represent better than 97 per cent of the total rural electrification of the territory. Municipal utilities have never figured very prominently in farm electrification of the Northwest because of charter limitations. Few of them now extend their lines very far beyond the suburban areas outside their city limits.

Table III summarizes the REA allot-

TABLE I
NUMBER AND PERCENTAGE OF FARMS USING CENTRAL STATION SERVICE IN IDAHO, OREGON, AND WASHINGTON

	Idaho, Oregon, Washington		Idaho		Oregon		Washington		National
	No. Farms Served	Per Cent Total Farms	No. Farms Served	Per Cent Total Farms	No. Farms Served	Per Cent Total Farms	No. Farms Served	Per Cent Total Farms	Per Cent Total Farms
1923	23,711	14.2	5,000	12.0	5,240	9.5	13,471	19	2.8
1928	51,756	31.0	10,419	25.0	12,685	23.0	28,652	39	..
1933	68,412	40.8	12,768	30.7	17,156	31.1	38,488	54.2	11.35
1937	96,170	52.2	20,109	48.0	29,016	47.5	47,045	58.0	19.3*
Total Farms, 1935	184,161		41,919		61,137		81,105		6,422,088
Total Farms with Dwellings Valued Over $500—1935	145,671		30,779		49,134		65,758		4,328,092
Relation of Electrified Farms to Total With Dwellings Over $500	66.4		65.3		59.1		71.5		28.7

* Farms Served Nationally, Dec. 31, 1937—1,241,505.

TABLE II
RURAL CUSTOMERS (FARM PLUS OTHER RURAL) AND MILES OF RURAL DISTRIBUTION LINE OF MAJOR COMPANIES AND MUNICIPALS SERVING IDAHO, OREGON AND WASHINGTON

	TOTAL		IDAHO		OREGON		WASHINGTON	
	Rural Cust.	Miles of Line	Rural Cust.	Miles of Line	Rural Cust.	Miles of Line	Rural Cust.	Miles of Line
Calif. Ore. Pr. Co.	6,017	1,024			6,017	1,024		
East Ore. Lt. & Pr. Co.	785	163			785	163		
Grays Harbor Ry. & Lt. Co.	983	57					983	57
Hermiston Lt. & Power Co.	109	27			109	27 A		
Idaho Power Co.	18,162	3,076	16,712E	2,698	1,450E	378		
Mountain States Pr. Co.	11,018	1,170	131	28	10,873	1,139	14	3
Northwestern Elec. Co.	5,800	743			548E	117	2,252	626
Pacific Pr. & Lt. Co.	14,522	1,771			3,873	529	10,649	1,242
Portland G. E. Co.	36,320	2,876			35,866	2,851	454	25
Puget Sound Pr. & Lt. Co.	83,177	6,000	7,183E	1,023			83,177	6,000EI
Utah Pr. & Lt. Co.	7,183	1,023						
Washington Gas & El. Co.	578	37					578	37
Washington Water Pr. Co.	11,117	{ 635-C { 1,495-C		{ 200-C { 332			8,005	{ 435-C { 1,163
West Coast Pr. Co.	4,746	603	467	84	2,074	277	2,205	242
Total Private Companies	200,517	20,700	27,605	4,365	61,595	6,505	111,317	9,830
Eugene Water Board	1,814	105			1,814R	105		
Seattle—City Light	3,435	111					3,435	111
Tacoma—Light Dept.	1,831	97					1,831N	97N
U. S. B. R.—Minidoka Proj.	1,344	300	1,344	300				
R. E. A. Projects (Table III)	613	172	574	159			39	13
Total Munic.-Govt.-Co-ops.	9,037	785	1,918	459	1,814	105	5,305	221
Grand Total	209,554	21,485	29,523	4,824	63,409	6,610	116,622	10,051

All above figures as of dates between Nov. 1937 and June 1938.
A—Approximate.
E—Estimated—(1) by compiler.
C—Customer-owned Lines Served by Company.
R—Residential Customers Only.
S—Suburban Customers not Included.
N—Not including Lines and Customers of 11 Small Mutual Companies buying wholesale from Tacoma.

TABLE III
SUMMARY OF REA PROJECTS IN IDAHO, OREGON, WASHINGTON

	No. of Projects	Allotment	Allotments Miles	Allotments Customers	Status as of May 10, 1938 Under Construction or Completed Cost or Contract	Miles	Customers
Idaho	2	$ 970,750.00	887.5	2,994	$ 368,576.70	391.5	1,086
Oregon	3	361,000.00*	294	1,339	252,898.46	219.5	1,160
Washington	7	1,092,200.00**	977	3,039	550,715.09	490.5	1,204
Total	12	$2,423,950.00***	2,158.5	7,372	$1,172,190.25	1,101.5	3,450
		Per Cent of Total Allotments to Date—			48.3%	52.3%	46.8%

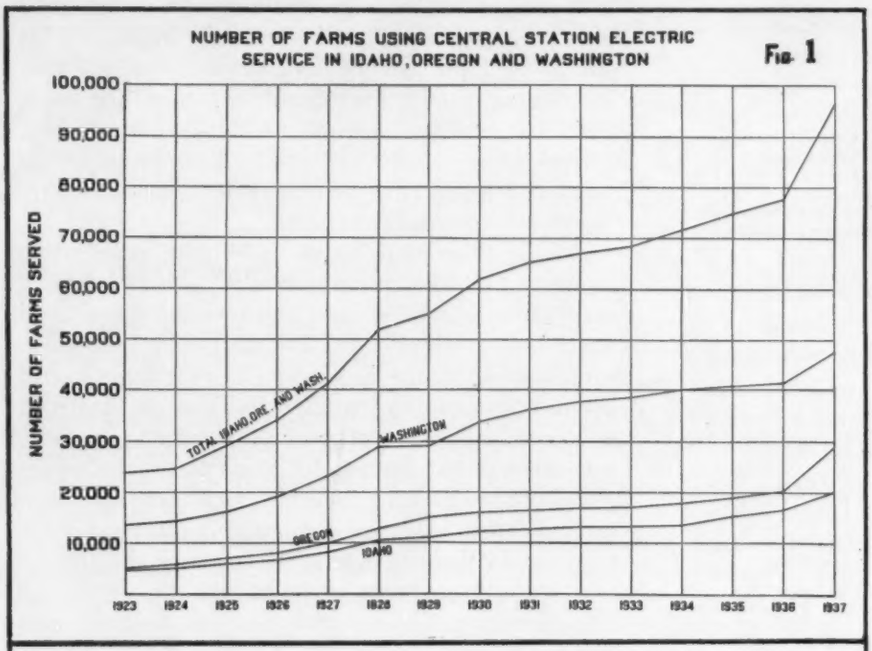
FOOTNOTES:
* Includes $19,000 for one generating plant and $15,000 for wiring on one project. Excludes $100,000 allotted to Portland General Electric Co. for 109 miles and 572 customers. Allotment held up.
** Includes $41,000 for one generating plant and $4,000 for wiring on one project.
*** Equals 2.77% of $87,624,814 total allotments to May 10, 1938.

SUMMARY—MAY 10, 1938

	No.	Miles	Customers
Projects completed in whole or in part	2	172	613
Projects Under Construction in whole or in part	9	929.5	2,837
Parts of above projects not started	(6)	991	3,707
Projects not started	1	66	216
Total allotments to date	12	2,158.5	7,373

* Abstracted for ELECTRICAL WEST by the author from a lecture delivered at the Reed College Institute on Northwest Affairs, Portland, July, 1938.

RURAL LOADBUILDING



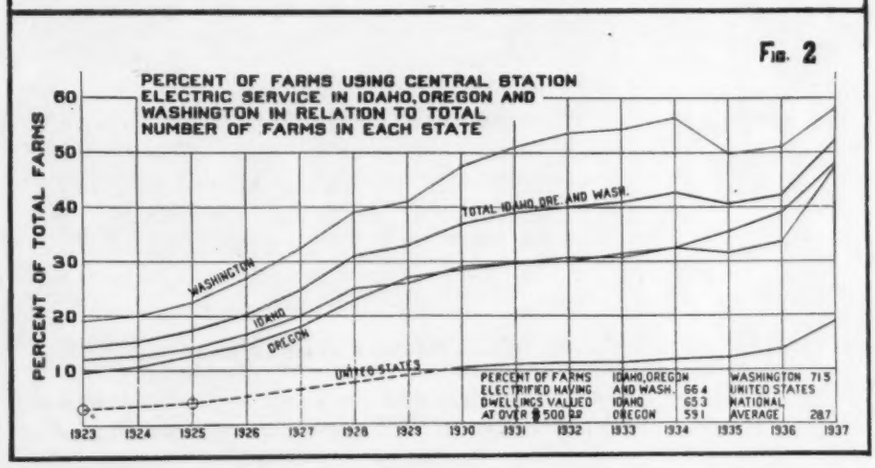


Fig. 2
PERCENT OF FARMS USING CENTRAL STATION ELECTRIC SERVICE IN IDAHO, OREGON AND WASHINGTON IN RELATION TO TOTAL NUMBER OF FARMS IN EACH STATE
PERCENT OF TOTAL FARMS
60
50
40
30
20
10
TOTAL IDAHO, ORE. AND WASH.
WASHINGTON
IDAHO
OREGON
UNITED STATES
PERCENT OF FARMS ELECTRIFIED HAVING DWELLINGS VALUED AT OVER $500 IDAHO, OREGON AND WASH. 66.4 IDAHO 65.3 OREGON 59.1 WASHINGTON 71.5 UNITED STATES NATIONAL AVERAGE 28.7
1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937

ments for projects in the three states and gives the status of those projects as of May 10, 1938. The summary consolidates the figures into projects completed, under construction and not yet started. It will be noted that approximately one-half the projected work is under way, and at least four of the projects listed as under construction have recently been energized. These figures show that REA's contribution to rural electrification in this territory has not been of any considerable proportions to date.

Many surveys have been made to determine the extent of rural service and its future possibilities. In 1934 a study by the NWEL&PA showed that service was available to 72.4 per cent of Oregon's rural population. Portland General Electric's lines cover all the arable land in its territory and 85 per cent of all possible customers in the area are "under" these lines. Puget Sound Power & Light's 83,000 rural customers are 48.2 per cent of the total number of customers it serves, and service is available to 90 per cent of the rural inhabitants in its territory. Pacific Power & Light serves 73 per cent of all inhabitants in one of its typical districts. A study of 1,569 unserved dwellings adjacent to the rural lines of Northwestern Electric showed that only 10 per cent were reasonably good prospects. Idaho Power serves as high as 85 per cent of all farms in some of its districts and 70 per cent of all farms in its territory.

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Proving Farm

Westinghouse undertakes to show that farmers need electricity

Establishment of an electrified proving farm to align closer the nation's farms with the mass production methods of industry has been undertaken by Westinghouse Electric & Mfg. Co. in cooperation with sixteen other manufacturers. The farm is located at Rochester, N.Y.

The project is aimed at three objectives: (1) Proving the necessity and benefits of electric power to the more than 3,000,000 farms with dwellings valued at more than $500 which are now without electric service, (2) demonstrating additional jobs and time-saving methods possible with electric power on the 1,250,000 farms in the $500 bracket which are today receiving electric service and (3) improving the design of electrified farm machinery and appliances.

●

Banishing Rust

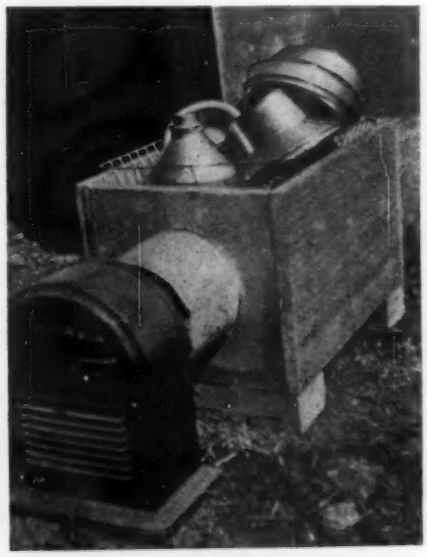
About an invention which keeps milking machine parts shiny

Rusting of metal separator and milking machine parts which have been improperly dried after washing in the milk-house is a problem many dairymen have to face. Ross Cruickshank of near Dayton, Ore., solved it, however. He built an electric drier, used especially in the drying of separator disks.

The drier is a 12x12x18-in. box lined with sheet metal and built of 1-in. boards. The bottom is curved so that air is more easily forced upward over the utensils. Cut in one side is an 8-in. circular opening into which a metal pipe is inserted. Operating mechanism consists of a 6-in. fan and a 1,375-watt water heater which operate only a few minutes each day.

In the drying process, water is first wiped from the utensils with a cloth. Then the fan is turned on.

So easy and successful is the operation that Cruickshank claims never to have seen a spot of rust on his separator disks during the two years he has used the device.



Ross Cruickshank's effective drier

EDITORIAL

Bonneville For Industry

ONE WHO studies the marketing problems associated with the Bonneville project in the Pacific Northwest must marvel at the degree to which popular misunderstanding is misdirecting the efforts to put Bonneville power to work. The unfortunate restrictions which cause large industrial customers to shy away from Bonneville are based on the fallacy that the industrial use of power would deprive the small customers in the contiguous area of the benefits of the project. As a matter of fact, the development of basic industries which could use this power would consume raw materials which are now unused, would provide employment and payrolls, would bring in new population and would increase the domestic market for products which now must seek buyers elsewhere.

Two noteworthy authors, Dr. Hodge of Oregon State College, and Walter May, eminent industrial engineer, discuss this problem elsewhere in this issue. Dr. Hodge relates his argument to the plight of the Northwestern farmer, and reaches this conclusion: "What benefit is it if the farmer saves $1.68 a year on his electric bill and loses his whole farm?" He implies that lower cost electricity is not the farmer's problem, but that creation of new markets for his farm products is fundamental to his welfare. Mr. May points to the tremendous raw material resources which the Northwest possesses and shows how development of these by new industries would benefit the entire community.

If the public of the Northwest can be made to understand these facts, then there is hope for working out a cooperative program whereby the Bonneville Administration and the existing power distributing agencies can secure for that region benefits far in excess of any minute reduction in the electric bills of present customers.

A Chance to Organize

IN A TERRITORY as remote from eastern manufacturing headquarters as is the Pacific Coast, the lot of the manufacturers' agent or representative is frequently a difficult one. He seldom sees his principals; most of his business transactions are by mail; his lines, if they are good ones, are sniped at by individuals who envy his success; his pioneering sales work sometimes goes for naught when a manufacturer throws him over, cuts his commissions or decides to establish a direct factory branch. Usually these latter things happen because the principal is not thoroughly familiar with field conditions.

All of this leads to an inevitable conclusion, namely, that the manufacturers agents—particularly those handling the engineering lines—could appreciably better their lot if they would form some sort of local organization in which they could discuss their mutual problems. There is plenty of evidence that such a plan would work. Agents who sell through the wholesaler some time ago recognized the benefits that would accrue through regularly meeting with one another and studying plans to promote their interests. Result was the formation in both northern and southern California of Ben Franklin Clubs which have functioned successfully for three years. One of the principal benefits has been the understanding and mutual confidence which have developed through regularly sitting down together and becoming thoroughly acquainted. There is ample opportunity for the successful operation of a similar organization among those agents and representatives whose lines do not qualify them for membership in the Ben Franklin Clubs.

Wanted—Sales Coordination

OCCASIONALLY an industry defeats the best efforts of its salesmen by failure to perfect its distribution methods. Advertising campaigns are launched before production is started or before dealers' shelves are stocked. Public demand is created and then lost when the prospect is told that he will have to wait for delivery or that what he wants is not a stock item.

In an industry as intricate as the electrical business such things can happen, but they should not be permitted to prevail for long. A case in point has developed in this territory. A utility company with scores of domestic lighting salesmen requires that these men make fifteen recommendations per week for improving the illumination of customers' homes. Most of these recommendations cover lighting equipment which the utility itself does not sell. In six of its divisions, there is not a dealer or a contractor who stocks the modern, efficient fixtures which the salesmen sell to the customer. Stock answer from the trade when questioned is: "My supplier doesn't handle that kind of equipment."

In such a case the utility would be justified in following one of two courses: It could sell the

ELECTRICAL WEST

DEVOTED TO THE ECONOMIC PRODUCTION, TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER AND ITS APPLICATION TO INDUSTRY, COMMERCE, AGRICULTURE AND HOME IN THE PACIFIC EMPIRE, AND TO THE MARKETING OF EQUIPMENT AND APPLIANCES AND OTHER UTILIZATION DEVICES IN THAT AREA

fixtures itself, or it could go in the jobbing business. However, it would be far better for the other branches of the industry to correct their distribution practices. If the distributors were to supply the trade with the types and kinds of equipment that the utility salesmen recommend, there would be profit for both.

Gas Challenges

GIRDING its loins for a defensive battle, the gas industry is set to launch a counter-offensive on the increasing popularity of electric ranges with American housewives. In an effort to offset the inroads of what one of our gas contemporaries has called electric "coo-cookery," the gas industry is laying down a barrage of publicity about its new "CP" range (CP stands for "certified performance," in case you are curious). The public is being told that this new appliance is the greatest thing in cookery ever to be created.

Examination of this super-super gas range reveals it to be a pooling into one range of all gas-range features that have been developed during the past few years. The manufacturers have buried the competitive hatchet to join all their gadgets against the common enemy, the electric range. For those special services which only electricity can deliver and for which a close gas imitation cannot be devised, electricity is wired to its rival.

Glancing at the list of 22 features claimed for the CP range may bring a smile to electric-range people, for the effort to eliminate matches, to cook on stored heat, to speed up the gas flame to meet fast electric-element competition, to make cleaning almost as easy as an electric, to broil smokelessly, to cook by the waterless method, to insulate the oven to assure coolness—yes, even to light the oven electrically as well as the top of the range—are all obviously attempts to answer the competition which the electric range is now giving the gas range.

However, an amused smile will not keep the electric range sold and selling in the face of all these blandishments. The powerful national and local advertising campaigns which have been launched to put over this CP range are strong stuff and will sell quantities of them to housewives who may not be reached by the electric range salesman with his compelling story. Of what use will it be to know that all of the gas range's new services are performed still better with cleaner, less troublesome electricity, if the customer does not realize this fact? It may tickle the ego of the electrical industry to know that its range has caused the gas industry such worry, but let not the gas industry lull us into complacency the while it is selling its range into more homes.

Fun is fun, but business is also business, and it is our industry's challenge right now to show its customers that gas is still gas, but electricity is superior.

Light's New Horizon

AGAIN the lighting industry has lifted the horizon of its opportunity. Pioneer always, light has moved at the forefront of almost every other electrical usage. During early years light was the chief reason for generating electricity, and it always has been one of the chief sources of revenue for the electrical industry. Early methods of creating light were wasteful and the product itself was unsatisfactory. The newcomer, electricity, by contrast to the light sources it replaced, was superior in cleanliness, safety, flexibility and convenience.

Improvements have been made constantly. The tungsten-filament lamp was one of the first, and although a few people of little vision saw it only as a means of reducing revenue, the increased demand for the more efficient light doubled and trebled the income from the previous types. And the price of lighting to the public came down.

Now comes a radically different light-producing medium, the fluorescent tubular lamp. Its production of light is wholly electrical—not a by-product of heat. Consequently, it is so efficient a creator of light that it again gives rise to short-sighted fear that its too general use will reduce electric revenues.

Such a view overlooks the hunger for more light that has been growing among the public since the introduction of the Better Light-Better Sight campaigns. This demand for more light is today such that it cannot be satisfied with existing wiring or with the heat-producing present means of illumination. High intensities now desired are often physically intolerable because of the by-product heat. The fluorescent lamp really comes at a most opportune time to solve these problems.

Revenues from such a fortuitous circumstance of demand and the product to meet it should increase even as they did with the earlier advent of the tungsten lamp. The limits of interior lighting are still the outdoor levels of illumination—a long way yet to go.

NEWS OF THE INDUSTRY

P.G.&E. SEEKS CONSOLIDATION OF SAN JOAQUIN LIGHT

Corporate affairs of San Joaquin Light & Power Corp. and Midland Counties Public Service Corp. will soon be terminated if the California Railroad Commission grants Pacific Gas and Electric Co.'s application to exchange its preferred stock for outstanding preferred shares of the San Joaquin corporation. The application was filed last month.

Physical operations of the two companies have for several years been integrated with those of P.G.&E., which owns approximately 90 per cent of their stock.

"The proposed dissolution of the San Joaquin and Midland companies," said A. E. Wishon, president of both utilities and vice-president of P.G.&E., "is chiefly a matter of legal and financial significance, and will in no way affect their present personnel, operating methods or local purchasing policy.

"General headquarters will be maintained in Fresno, with all operating departments manned and functioning as at present, and with the general offices in that city supervising the various geographical operating units."

James B. Black, P.G.&E. president, said: "The proposed dissolution is in line with P.G.&E.'s long established policy of simplifying its corporate structure. Corporate simplification is also one of the objectives of public utility and tax legislation enacted in recent years, and it appears increasingly desirable to wind up the affairs of these two companies, the sole remaining gas and electric subsidiaries controlled by P.G.&E."

About 3,000 San Joaquin stockholders will be affected by the move. They can exchange one share of their 7-per-cent prior preferred or 7-per-cent preferred for four shares of P.G.&E.'s first preferred 6-per-cent stock, which has a present market value of approximately $120. For each share of San Joaquin's 6-per-cent prior preferred or 6-per-cent preferred, P.G.&E. offers four shares of its 5½-per-cent first preferred stock, with a present market value of about $108.

Time for acceptance of these exchange offers, made subject to approval by the railroad commission, is limited to Sept. 30, 1938.

In 1932, upwards of 6,000 San Joaquin stockholders, owning more than three-fourths of the stock then outstanding in the hands of the public, accepted a similar exchange offer.

Owners of the San Joaquin preferred stocks who do not accept the present offer will, under provisions of the articles of incorporation, receive the par value of their holdings, together with unpaid accrued dividends.

It is expected that the San Joaquin corporation will soon make an offer to purchase the small amount of its common stock remaining in the hands of a few holders.

NEW HYDRO DEVELOPMENT ON COLORADO LOOMS

Application for a 24-mo. preliminary permit for a proposed 1,100,000-hp. hydroelectric development on the Colorado River in Mohave and Coconino Counties, Ariz., was filed last month with the Federal Power Commission by the Colorado River Commission of Arizona, in behalf of the State of Arizona.

The project, approximately 30 mi. upstream in a direct line from Boulder Dam, would consist of a dam raising the water level 570 ft. and creating a lake 78 mi. long with a storage capacity of 2,500,000 acre-ft. and a power plant having an installed capacity of 800,000 hp. with provision for the installation of 300,000 additional hp.

Power from the proposed project would be used primarily to develop the natural resources of northeastern Arizona and southwestern Utah.

OGDEN CITIZENS VOTE DOWN MUNICIPAL POWER PLANT

Residents of Ogden, Utah, last month turned thumbs down on municipal ownership of an electric power and light plant. By a 1,000-vote margin they defeated four proposals to enter into a contract with A. C. Todd for construction of a municipal plant through the issuing of $2,600,000 in revenue bonds.

A total of 10,853 votes were cast. Thirty-seven districts opposed the plant, while eighteen favored it.

Active campaigning on the part of both the city council, which favored the plant, and a group of citizens opposing it lasted for several weeks. The citizens' committee maintained that the agreement between Todd and city officials was not carried out in the regular manner. Preliminary plans and specifications, it said, were not prepared, and competitive bidding was not called.

CONTRACTS AWARDED FOR BONNEVILLE PROJECT

Bonneville administration last month set out to spend the $10,750,000 of PWA funds allocated the end of July. At the same time it announced FPC approval of the sale to Northwestern Electric Co. of 5,000 kw. of Bonneville power.

First contract was awarded to the Aluminum Co. of America for conductor for the transmission line from the plant to Vancouver, Wash. Specifications for the line, which will operate at 115,000 volts, called for high strength conductor. Cable offered was 795,000 circ.mil. ACSR. Bid was $286,-934. Delivery will start Nov. 1.

Four days later, Aug. 15, the administration opened bids on 35,000 insulators for the Bonneville-Vancouver line and simultaneously called for bids on 243,888 insulators for other lines.

Awarded the contract for the Vancouver insulators was Ohio Brass Co., with a bid of $26,500, f.o.b. factory. Other insulator bids will be opened Sept. 15, on 137,000 insulators for the line between Bonneville and Grand Coulee; 43,016 insulators for the line from Vancouver to Eugene, Ore.; 13,-968 for the line from Bonneville to The Dalles, Ore., and 49,904 for the line from Vancouver to Kelso and Aberdeen, Wash.

Bids will also be opened Sept. 13 for furnishing two turbines with accessories, governing equipment and embedded parts, and Sept. 28 for furnishing and installing in the Bonneville power house two 60,000-kva. alternators and auxiliaries and for anchor bolts and embedded foundation plates for two additional generators of identical design. Bids will also be taken on 1,568 steel towers and 1,974 mi. of conductor.

Sale of power to Northwestern Electric Co. will be on a four-months' experimental basis. Delivery will be made at North Bonneville, Wash., adjacent to the dam site, to the company's 66,000,-volt line running from its Condit plant on the White Salmon River to Vancouver and Portland. The sale is for 2,500 kw. of primary power at $17.50 per kw.-yr. and 2,500 kw. of secondary power at $11.50 per kw.-yr., pro-rated monthly for the four-month period.

It is contemplated, under terms of the contract, that Northwestern will pass on some of the power to Portland General Electric and Pacific Power & Light.

WALKERIZED

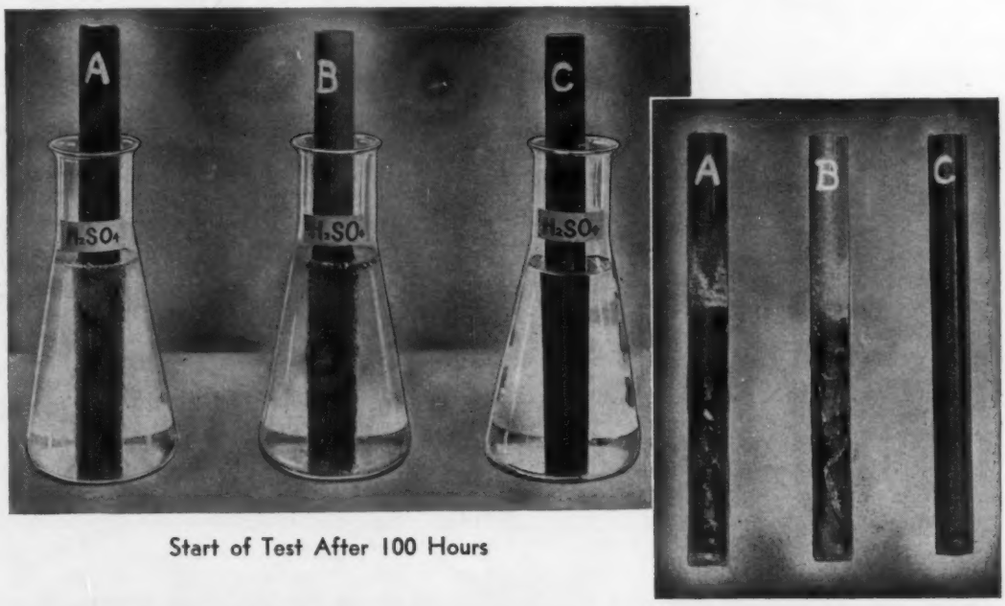
DUALCOTE

Your worst corrosion troubles can now be cured with WALKERIZED DUALCOTE, the new conduit that resists acids, alkalis, and salt water.

Compare these Results

after treating three brands of conduit with sulphuric acid for 100 hours.

Samples A and B are high grade galvanized conduits, with the ordinary finishes. Sample C is Walkerized Dualcote.



Start of Test After 100 Hours

There is no premium for this extra protection.

WALKER of Conshohocken, Pa.

Ask Our Nearest Representative for full details

GARNETT YOUNG & CO.
910 E. Third St., Los Angeles
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503 Polson Bldg., Seattle

Other Bonneville developments included: Announcement by the Hood River, Ore., city council that it will buy 100 kw.-yr. of Bonneville power for municipal purposes. Action by the Cascade Locks, Ore., city council authorizing negotiations for the purchase of the West Coast Power Co.'s distribution system at a price not to exceed $50,700. Promotion by county utility commissioners in the State of Washington of a plan under which the Bonneville administration would take over utility systems in Cowlitz, Wahkiakum and Pacific counties.

●

FPC Denies P.G.&E. Petition To Eliminate Reservoir

Pacific Gas and Electric Co.'s application to eliminate provisions requiring construction of the Alder Creek reservoir and enlargement of the El Dorado conduit from its license for a project on the south fork of the American River was rejected last month by the Federal Power Commission.

The commission agreed that the project need not be completed at present, but maintained that evidence does not show the reservoir and conduit will not be necessary in the future. Accordingly, the company will be permitted to install additional generating facilities or to purchase or interchange additional energy prior to completion of the reservoir and conduit.

●

BIDS WERE OPENED Sept. 7. for furnishing for installation in Grand Coulee power plant two 14,000-hp., 400-r.p.m., vertical-shaft, single-runner, Francis-type, hydraulic turbines; two oil-pressure governors, and two 12.500-kva., 6,900-volt, 60-cycle, eight-tenths power factor, 400-r.p.m., vertical-shaft, a.c. generators, each complete with direct-connected main exciter and pilot exciter and thrust and guide bearings.

THREE LARGEST GENERATORS in the world—108,000-kva., unity-power-factor, 120-r.p.m., 13,000-volt, three-phase, 60-cycle, vertical-shaft, a.c. units—will be built for the Grand Coulee project by Westinghouse Electric & Mfg. Co. at a cost of $2,611,000. The contract was awarded Aug. 19.

●

DATES FOR THE 1938 fall conclaves of the Pacific Coast Electrical Assn. have been set by the board of directors for Sept. 29 and 30 in San Francisco and Oct. 6 and 7 in Los Angeles. Programs are being arranged by the guidance committees of the business development, engineering and operation and administrative services sections.

J. D. Ross Visions Intertying Of All Federal Power Plants

Annual electric power output in the U. S. has increased tenfold in the past eighteen years. In another seventeen years the output will again increase tenfold. It is necessary, therefore, to prepare for this future by intertying the giant federal power plants by means of transmission lines extending from ocean to ocean, border to border.

Such was the message brought by Bonneville Administrator J. D. Ross to the Engineers' Club of Seattle, July 28.

Ross's contention was that such a nation-wide power pool would eliminate possible local shortages of power. Because of the time difference between the east and the West, peak loads would be spaced out. Furthermore, he said, low water conditions in one hydro-electric system could be bolstered by current from other watersheds.

According to Ross, present alternating-current systems would be linked by lines which would carry direct current at 500,000 to 1,000,000 volts. Giant rectifying tubes would permit conversion from a.c. to d.c. and back to a.c. again. As a surety against aerial attacks, underground cable might be used.

The electric power needed to supply the 1,210,500,000,000-kw.-hr. demand Ross foresees in 1955 would be furnished by development of the nation's 63,000,000 kw. of water power and by steam plants in Texas, the Dakotas and Pennsylvania.

Ross estimated that on an 80-percent load factor, Bonneville power could be sold at wholesale in Chicago at ⅓c per kw.-hr. His proposed system, he said, would tend to equalize the cost of electricity throughout the country.

●

IDAHO POWER CO. is scheduled soon to start construction of a $60,000, 17-mi. transmission line connecting Gooding and Shoshone, Ida. At present Gooding is served by the Malad plant; Shoshone by a line from Shoshone Falls. The new line will make either source of power available to both towns.

●

WHAT IS BELIEVED to be the first demand for wholesale electric power, under the people's utility district schedule offered rural cooperatives, has been filed with Portland General Electric Co. by the Salem (Ore.) Electrical Co-operative Assn. The association, which comprises one city block in downtown Salem, asked for 45 kw. The cooperative rate structure is about half the normal retail rate. The city block to be served is already served by retail lines.

SAN FRANCISCO will not vote in September on a municipal electric distribution system. Vagueness of financial estimates led the board of supervisors to refuse a place on the ballot to the Public Ownership Assn.'s $21,000,000 scheme for distribution of Hetch Hetchy power in a section of the city. However, utilities-commission engineers are preparing a plan of municipal distribution to cover the whole city. This is expected to be submitted to the voters in the form of a $50,000,000 or $60,000,000 revenue bond proposal at the November election.

●

VALIDITY OF Public Utility District No. 2 of Pacific County, Wash., has been upheld by the state supreme court, which ruled that contrary to claims made by Edison Vickers, taxpayer, sufficient legal notice had been given before the election to vote on formation of the district. Vickers maintained that the county auditor had failed to post special election notices in each voting precinct.

●

Flathead Project Dedicated; Named for Frank M. Kerr

Dedicated last month as the Frank M. Kerr Hydroelectric Project was Polson Dam, Mont. Kerr is president and general manager of Montana Power Co., which constructed the project.

More than a thousand Indians joined in the celebrations, which attracted government and industrial leaders from throughout the state. Said Sen. Burton K. Wheeler, one of the principal speakers: The project is a better job than the government can do. Other speakers included Kerr, C. F. Kelley, president of Anaconda Copper Mining Co., and Gov. Roy E. Ayers.

TRANSFER FROM the Rocky Mountain Power Co. to the Montana Power Co. of the license for the Kerr Hydroelectric Project has been authorized by the FPC.

●

PACIFIC POWER & LIGHT CO. is spending $75,000 for an inter-tie with the 6,000-kw. steam plant of the Shevlin-Hixon Lumber Co. at Bend, Ore., for the purpose of increasing the generating capacity available for its Deschutes district. The project consists of the erection of 1¾ mi. of 24-kv. line from the lumber company station to the Bend hydro plant. A 3,000-kva. transformer bank, together with control and switching equipment, is being installed at each end of the line. As a further improvement to service in the Deschutes area, a 22-kv. regulator has been installed on the Redmond-Princeville transmission line.

Idaho Town Seeks to Revive $650,000 Municipal Power Plant

Coeur d'Alene, Ida., city council last month voted to attempt to revive its proposed $650,000 municipal power plant, plans for which were shelved after the U. S. District Court ruled that PWA could not legally finance it.

The case, in which Washington Water Power Co. gained an injunction against the city entering the power business, attracted considerable attention in 1935 as a test of the government's right to aid in financing a power project in competition with a private utility.

The council, seeking dissolution or modification of the ruling, adopted a resolution stating that the action would be taken to clear the way for proceeding with the municipal power project with a government grant if the council "sees fit."

●

BIDS FOR CONSTRUCTION of a 115,000,-volt, three-phase, single-circuit, 60-cycle, wood-pole transmission line which will carry Kendrick project power from Cheyenne, Wyo., to Gering, Nebr., will be opened by the Bureau of Reclamation Sept. 21. The line will be approximately 93 mi. long.

●

LOS ANGELES' BUREAU of Power & Light was last month reported to be planning to market approximately $10,000,000 of revenue bonds some time in September. Proceeds of the bonds, together with $9,000,000 of the $10,000,000 of bonds sold last December, would be used to construct the Bureau's third transmission line from Boulder Dam and a general office building in Los Angeles.

●

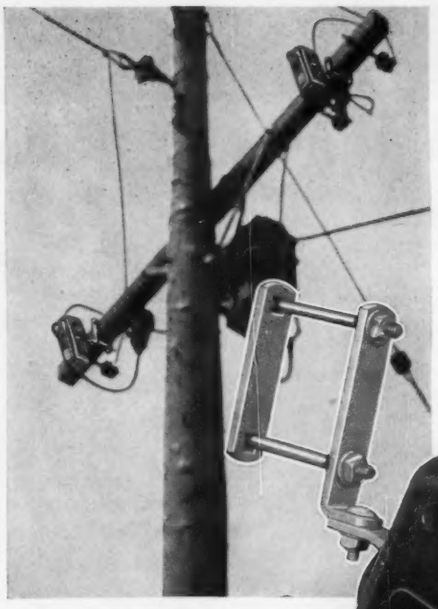
TO PREVENT A CITY WATER SHORTAGE in the summer, Pacific Power & Light Co. and the City of Hood River, Ore., will exchange power during certain seasons of the year. In the summer, when a heavy water demand hinders efficient operation of the city's hydro plant, the utility will furnish power without cost to operate the city street lighting system between dusk and 10 p.m. In the fall, when the water demand ends and the city has surplus power, the energy will be returned to the company.

●

TO ENCOURAGE USE of electric ranges and heating appliances, the New Westminster, B.C., city council has set a new rate of 4c per kw.-hr. for the first 30 kw.-hr., 3c per kw.-hr. for all additional. Twenty-per-cent reduction is allowed for prompt payment of bills.

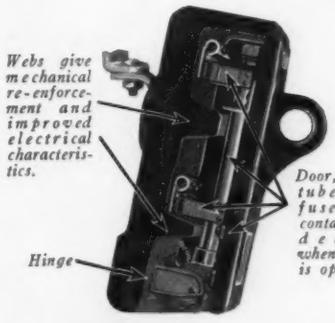
●

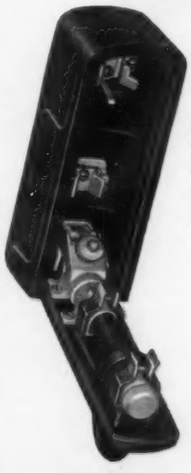
TO IMPROVE street-car service in Vancouver, B. C. Electric Railway Co. is building a new substation in the east end of the city. The station will house a single 1,000-kw. generator.



Typical of many S & C SEB Cutout Installations

S & C Type SEB Semafor Enclosed Cutout, 50 and 100 Amp., for 5000 and 7500/12500Y Volt Systems.


Webs give mechanical re-enforcement and improved electrical characteristics.
Door, fuse tube and fuse tube contacts are dead—when door is open.
Hinge



During fuse operation the door (spring-actuated) opens—and when in open position it is dead including the hinges, fuse tube and the tube contacts.

Faster Clearing

REG. U. S. PAT. OFF.

Enclosed Cutouts

Type SEB

for MORE YEARS OF SERVICE

● When a fuse link blows there is a *positive,* spring-actuated separation of the fuse link terminals. A "flipper" at the bottom end of the tube causes the spring action to pull the link cable straight out of the tube.

Short circuits are cleared faster . . . Gases and fuse link cable are vented faster.

After the arc is cleared, door drops open, providing Semafor indication of an open circuit. In the open position, —door, hinge, fuse tube and tube contacts are *dead.*

S & C quality of design, heavy rugged mechanical construction, and accuracy assure you safe protection at low cost over long years of service. . . . This and reduction of unnecessary outages with S & C Fuse Links mean lower service expenses.

Thousands of S & C Semafor Cutouts in service are reducing maintenance costs—engineers are selecting these devices because of their proven superior performance.

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Los Angeles.....Farnham & Cunningham, Edison Bldg.
Seattle.....T. S. Wood, 220 Ninth Street, North
Salt Lake City.....Riter Engineering Co., Kearns Bldg.

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is SMASHING ALL SALES RECORDS with the NEW MATCHED TOASTSWELL LINE!

Dealers Everywhere

are voicing their enthusiastic approval of this new, modern line of fast selling, long profit electrical merchandise by placing their orders now—conclusive proof that 1938 will be another banner Toastswell year!

You'll be enthusiastic too when you see the smart, new combination automatic sandwich toaster and the stunning new automatic waffle baker that perfectly match the now famous, ultra-modern Toastswell automatic two-slice and four-slice bread toasters, which have increased dealer's sales beyond their greatest expectations.

TOASTSWELL . . .

2-SLICE *Automatic* TOASTER

$10.95

Equipped with TIME MASTER *Control*

that assures uniform toast at all times, and low heat feature that keeps toast hot and makes delicious melba toast.

Non-automatic toasters and tray sets also available.

TOASTSWELL . . .
4 SLICE AUTOMATIC TOASTER

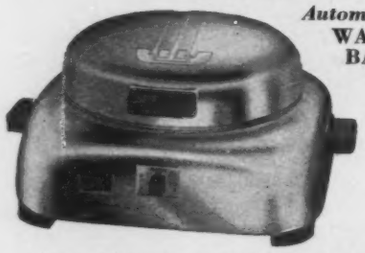
$15.00

Toasts four slices of bread on both sides at one time. Same mechanical features as two-slice toaster.

Non-automatic toasters and tray sets also available.

TOASTSWELL . . .

Automatic WAFFLE BAKER



Beautiful tray set with syrup and batter pitchers also available.

WRITE TODAY for complete information on the new matched Toastswell line. You'll be sure to want to share in the extra profits that will be yours with Toastswell.

UTILITY ELECTRIC CO.
620 TOWER GROVE ABE. ST. LOUIS, MO.

ARTIFICIAL GAS SERVICE in Pocatello, Ida., will be discontinued Dec. 28, 1938, by order of the state public utilities commission. Arrangements have been made whereby Idaho Power Co. will make it possible for all former gas customers to obtain reasonable trade-in values on ranges, refrigerators, etc. Sale price of any appliance will also include wiring and installation costs. The gas concern, Citizens Utilities Co., served 1000 customers in Pocatello, 950 of whom were gas range users, 300 gas water heater users and 100 gas refrigerator users.

●

ELECTRICAL MAINTENANCE ENGINEERS' ASSN. of Southern California will discuss "Power Factor" at its Sept. 20 meeting. Demonstration-lecture of "Adventures in Electricity" will be given Oct. 11.

●

TRUCKEE (CALIF.) PUBLIC UTILITY DISTRICT is making application for a PWA grant with which to erect a $100,000 power plant to serve the district. District directors assert that the cost of producing the power needed will be only about half the $12,000 now paid Sierra Pacific Power Co. During the past five years the district's load has increased more than 30 per cent.

●

APPLICATION for a PWA grant of $2,310,750 with which to complete Ruby Dam, key structure in Seattle City Light's Skagit project, was approved late in July by the Seattle city council. The money is to be matched by $2,824,250 to be raised by sale of City Light revenue bonds. The project provides for raising the dam from 1,280 to 1,515 ft.

●

AN ELECTRIC BRANDING IRON. That is what a San Luis Obispo, Calif., cattleman has asked Paul King of San Joaquin Light & Power Corp. to invent. The iron, to be made from a regulation Calrod unit, would replace the old-fashioned iron heated in a charcoal fire.

●

NEVADA - CALIFORNIA ELECTRIC CORP. has received FPC authorization to issue to Bank of America its promissory note of $700,000. Proceeds are to be used toward refunding $736,667 of outstanding notes and for other corporate purposes.

●

POWER LOAD estimated at 80,000 kw.-hr. per month will be sold at Western Light & Power Co., Washougal, Wash., by Northwestern Electric Co. under terms of a one-year contract. The energy will replace the supply the Western company formerly received from its diesel plant, now shut down.

IAEI Chapter Refuses Blanket Condemnation of NECode

Northern California Chapter, Southwestern Section, International Assn. of Electrical Inspectors, meeting in San Francisco last month, refused to make a blanket condemnation of the changes proposed in the NECode by the president of the Edison Electric Institute.

Acting on each of the EEI's nine proposals, the chapter passed a resolution opposing the following revisions: general use of non-metallic sheath cable of covered neutral type as a wiring system; use of duplex and multiple conductor cables of the cover neutral types in raceways of all classes; bare neutral in conduit and electrical metallic tubing for general use; recognition of service cable of the covered neutral type for general indoor use; removal of the requirement for mandatory use of rigid conduit in theaters, elevators and hazardous locations, and of metal-clad wiring in garages; deletion of the rule requiring that conduit be shipped in 10-ft. lengths.

Favorable consideration was given modification of the conduit area rule to permit in old installations the utilization of conduit waste space for additional wire required for increased load, but no action was taken. Other recommendations were also passed over until further information is secured.

Next meeting was scheduled for Sacramento in November.

●

REA Activities

RAVALLI COUNTY COOPERATIVE ELECTRIC ASSN., Corvallis, Mont., has been allotted $43,700 to build 23 mi. of line to serve 88 customers and to complete initial project.

FERGUS COUNTY ELECTRIC COOPERATIVE ASSN., Lewistown, Mont., has been allotted $88,000 to build an 80-mi. line serving 195 customers.

NORTHERN IDAHO RURAL ELECTRIC REHABILITATION ASSN. has extended its line across the border between Boundary County, Ida., and Canada to serve the customs office and homes of five customs officials on the Canadian side. Only expense to the association was installation of three master meters on the U. S. side of the border. Service drops, poles and individual meters were installed by the Canadians at their own expense.

ORCAS POWER & LIGHT CO., Eastsound, Wash., energized its power system last month. The system serves 230 customers on Orcas Island.

FARMER'S ELECTRIC MEMBERSHIP CORP., Clovis, N. M., has awarded a contract to Reinhart & Donovan Co., Oklahoma City, for constructing the first section of the project, consisting of 199 mi. of line to serve 465 customers, $62,136.

OVERTON (NEV.) POWER DISTRICT No. 5 opened bids Aug. 25, for the construction of a 750-kva. substation, 24 mi. of 69-kv., 3-phase transmission line and 60 mi. of 7.2-kv. single-phase distribution lines. Also included

SQUARE D

IS TELLING THE STORY OF ADEQUATE WIRING TO HOME BUILDERS

IN ALL THE WORLD
NO THRILL LIKE THIS...
Your New Home
The Story of the SQUARE D MULTI-BREAKER
SQUARE D COMPANY
DETROIT - MILWAUKEE - LOS ANGELES

A copy of this folder will be sent upon request.

Every week, hundreds of these beautifully designed four color folders are being mailed by the thirty-six Square D offices throughout the country—to people who are building homes.

There is a Square D motive behind this activity—naturally. To sell Square D Multi-breakeRs. But in this folder we go far beyond that. We devote the inside pages to the basic story of *adequate wiring*. In simple, non-technical language we explain electricity and the importance of its control. And we refer these home builders to their electrical contractors for amplification of the important facts this folder contains.

Contractors will profit by backing this promotion; by telling and selling the story of the Square D Multi-breakeR and adequate wiring. Be sure you know the complete story. See your Square D distributor.

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SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

KLEIN
"Lightweight"
CLIMBERS

Klein "Lightweight" Climbers are built to the minimum weight possible consistent with maximum safety. Every pair is tested exactly the same as are the old time tried Standard Climbers. The lineman can throw his weight on these climbers with confidence —they are Klein's!

DISTRIBUTED THROUGH JOBBERS

Foreign Distributor: International Standard Electric Corp., New York

The four pamphlets listed below will be sent without charge to anyone interested. Check the ones you want:

- ☐ Lightweight Climbers.
- ☐ Specifications on Linemen's Belts and Safety Straps.
- ☐ Klein Kord Fabric Safety Straps.
- ☐ Pocket Tool Guide.

Mathias KLEIN & Sons
Established 1857 Chicago, Ill. U.S.A.
3200 BELMONT AVENUE

were 140 distribution transformers which will provide service for 370 customers.

GRAND VALLEY RURAL POWER LINES, INC., Grand Junction, Colo., has been allotted $48,000 to build 38 mi. of line in Mesa County.

SAN LUIS VALLEY RURAL ELECTRIC COOPERATIVE, INC., Monte Vista, Colo., has been allotted $166,000 to build 139 mi. of line in Alamosa, Rio Grande, Saguache and Conejos Counties.

BENT-PROWERS RURAL POWER LINES, INC., Lamar, Colo., has been allotted $303,000 to build 269 mi. of line in Prowers, Bent and Otero Counties.

DELTA-MONTROSE RURAL POWER LINES ASSN., Delta, Colo., has been allotted $200,000 to build 175 mi. of line in Delta and Montrose Counties.

CLEARWATER VALLEY LIGHT & POWER ASSN., INC., Lewiston, Ida., has been allotted $300,000 to build 264 mi. of line in Nez Perce, Lewis, Clearwater, Latah, Benewah, Shoshone Counties, Ida., and Whitman County, Wash.

LOWER YELLOWSTONE RURAL ELECTRIC ASSN., Sidney, Mont., has been allotted $26,900 to build 22 mi. of line in Richland County, Mont., and McKenzie County, N. D.

FLATHEAD POWER CO., Kalispell, Mont., has been allotted $91,000 to build 71 mi. of line in Flathead County.

●

Contracts Awarded

BY THE CITY OF PORTLAND for air conditioning of addition to art museum to Hastorf, Inc., Portland, $26,378; for electrical work on same to Jagger-Sroufe Co., Portland, $5,976.

BY BUREAU OF RECLAMATION for wood poles, cross arms, insulators and pole hardware for transmission lines on Kendrick project, Wyo. To Graybar Electric Co., New York, $105,873; to General Electric Supply Co., Denver, $36,953; to Seyler Mfg. Co., Pittsburgh, $3,744.

BY METRO-GOLDWYN-MAYER for electrical work, including underground feeders for stages, new power house, at studios, Culver City, Calif., to Pacific Electric & Mechanical Co., Los Angeles, $85,865.

BY G. B. MCDOUGALL, California state architect, to Collins Electrical Co., Stockton, Calif., for installing football floodlighting system, consisting of wood poles, enclosed floodlights and underground wiring, both primary and secondary, at San Luis Obispo, $6,913.

BY IMPERIAL IRRIGATION DISTRICT, El Centro, Calif., for materials to build distribution power lines from substations to consumers in all Imperial Valley cities taking district power. To Superior Pole Treating Co., Seattle, for poles; Superior Distributing Co., San Diego, for wire and meters; Rome Cable Corp., Rome, N. Y., for service entrance cables; Maydwell & Hartzell, Inc., Los Angeles, for insulators; Standard Transformer Co., Warren, Ohio, for transformers; Graybar Electric Co., Los Angeles, for fuses and cutouts. Total award, $300,000.

BY O. A. CARLSON ELECTRIC CO., Seattle, for 304 Westinghouse ranges to be installed in the Madison Park Apartment project, Seattle, to Seattle City Light, $20,000.

BY BUREAU OF RECLAMATION for 4,000 tons of reinforcement steel for the power plant at the west side of Grand Coulee Dam to Bethlehem Steel Co., San Francisco, $214,260.

TO BARRETT & HILP, San Francisco, for constructing toll plaza, including electrical work, on Yerba Buena Island, San Francisco Bay, $14,900.

BY B. C. ELECTRIC RAILWAY CO. to George Snider Construction Co., Ltd., Vancouver, B. C., for constructing a new electrical shop and meter building for the company, $50,000.

BY BUREAU OF RECLAMATION to Ohio Brass Co. for furnishing 70,000 insulators for transmission lines on the Kendrick and Riverton projects, Wyo., and the Colorado-Big Thompson project, Colo., $47,779.

BY IMPERIAL IRRIGATION DISTRICT, El Centro, Calif., to Fritz Ziebarth, Long Beach, for furnishing and erecting switching structures; switchboard, $9,219; 7,500-kva. substation at Brawley, $25,569; 5,000-kva. substation at El Centro, $21,021; 600-kva. substation at Westmoreland and 300-kva. substation at Heber, $7,829. To H. O. Bauerle, Los Angeles, for constructing 1,800-kva. substation at Calexico, 750-kva. substation at Imperial and 1,500-kva. substation at Holtville, $18,715.

BY GOLDEN GATE INTERNATIONAL EXPOSITION to H. C. Reid & Co., San Francisco, for installing high-bay lighting for Palaces 13 and 14, $9,975.

BY SEATTLE BOARD OF PUBLIC WORKS to Westinghouse Electric & Mfg. Co. and General Electric Co. for installing a filter press oven and oil purifier in City Light's South End receiving substation. Combined bid, $4,104.

ABOUT PEOPLE

O. R. Doerr to Coordinate P.G.&E. Sales Activities

O. R. Doerr has been appointed chairman of the general-office sales committee of Pacific Gas and Electric Co., in which capacity he will act as coordinator of all sales activities of the organization. According to R. E. Fisher, vice-president in charge of public relations and sales, the new appointment follows a realignment caused by the recent death of H. M. Crawford, general sales manager.

A native of Missouri, Doerr received his preliminary schooling in St. Louis and was attending St. Louis University when he joined the navy during the World War. Later he transferred to and was graduated from the Naval Academy at Annapolis. Resigning from the service in 1921, he joined the Great Western Power Co. in San Francisco as commercial clerk. He was successively sales manager of the electric home department and supervisor of appliance sales. Upon consolidation of P.G.&E. and Great Western, he was placed in charge of refrigeration sales for the former. Later he was supervisor of domestic

Paul M. Downing, author of the story on page 22. Mr. Downing, who is vice-president and general manager of P. G. & E., is especially qualified to speak on the problems of the private utilities. He has been connected with the electrical industry in the West for about 40 years

lighting. At the time of his promotion he was in charge of commercial lighting and was head of the sales planning committee.

●

San Diego Appliance Bureau Elects G. H. Dutton Chairman

Glen H. Dutton, Dutton's Radio Store, San Diego, has been elected to succeed Taylor Brown, Parmelee Dohrmann Co., San Diego, as president of the Bureau of Radio & Electrical Appliances of San Diego County. First vice-president is Archie Marsden, George Belsey Co.; second vice-president, Ben Rogers, Firestone Service Stores, and treasurer, Sam L. Hall, Electric Supplies Distributing Co., all of San Diego.

Board of directors is comprised of past President Brown, H. E. Brunelle, Harry Callaway, A. K. Chamberlain, James Harrington, R. E. Harris, Elmer Hazie, Jerry Heilbron, C. W. Kinmore, E. W. Meise, F. M. Pitt and P. P. Schmitt.

●

WILLIAM COURTNEY, formerly connected with the financial division of the U. S. Chamber of Commerce, Washington, has been named economist of the Los Angeles Bureau of Power & Light. In this newly created position he will help to determine policies affecting the administration of the bureau's affairs.

●

F. C. SCOTT, former district manager of Southern Colorado Power Co.'s La Junta district, has been appointed assistant to G. W. Milliken, vice-president in charge of sales. F. S. Johnson, manager of the Rocky Ford district, has been named head of the Valley division, a new consolidation of the LaJunta, Rocky Ford and Ordway districts.

IRVING C. HARRIS, consulting engineer who has been in charge of the inspection and installation of equipment at Boulder Dam for the Bureau of Reclamation, has been named director of power for the project. He will represent Secretary of Interior Ickes.

●

R. J. HOLTERMANN, Pacific Coast vice-president of Westinghouse Electric Supply Corp., San Francisco, has been appointed chairman of the guidance committee of the PCEA Business Development Section, succeeding C. W. Goodwin of General Electric Supply Corp.

●

T. W. SWARTZ, assistant superintendent of Northwestern Electric Co.'s underground department, has been made underground superintendent for Hawaiian Electric Co.

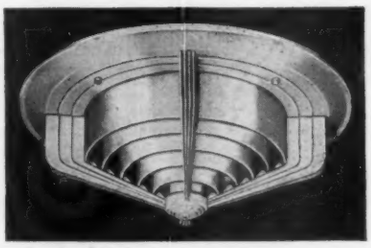
●

M. DAVIES, manager of Langley Electric Co.'s plant at Vancouver, B.C., has been elected vice-chairman of the Granville Island branch of the Canadian Manufacturers' Assn.

●

FRANK MCLAUGHLIN, President of Puget Sound Power & Light Co., has been named chairman for the State of Washington for the observance of Navy Day, Oct. 27.

Store Lighting that SELLS



Leading merchandisers have learned that STER-LITE FIXTURES help sell merchandise.

And Contractor after Contractor has learned that STER-LITE FIXTURES help in selling merchants.

You are away out in front with America's Number One selling light when you present STER-LITE FIXTURES. Write for FACTS and Figures.

H. B. SQUIRES
Representative
LOS ANGELES–SEATTLE
SAN FRANCISCO

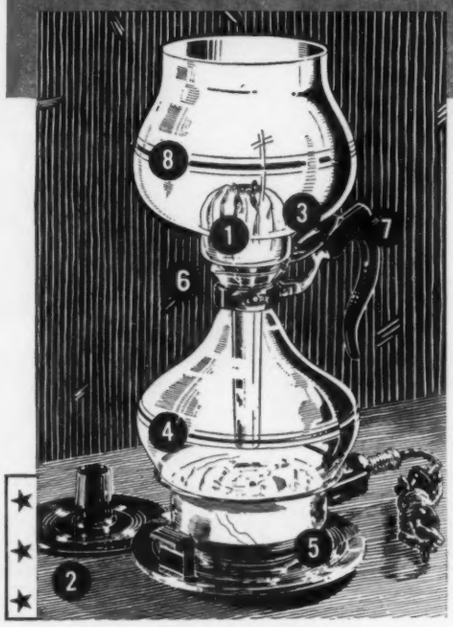
STERLING REFLECTOR CO.
1431 W Hubbard St CHICAGO

IMPORTANT *Reasons* WHY YOU SHOULD BUY THE CORY COFFEE BREWER

REG. U.S. PAT. OFF.

MORE SPEED! MORE BEAUTY!

Brews a better Cup of Coffee!



ONLY the CORY has the remarkable "Fast-Flo" Filter. It limits contact of water and finely ground coffee to 3 minutes . . . giving you just the rich, mellow, true coffee flavor . . . without bitterness, from boiling or too long steeping. *No metal touches the coffee.*

Only the **CORY** *gives all these Features . . . !*

1. "Fast-Flo" Filter
2. Bakelite Funnel Holder
3. Hinged Decanter Cover
4. Beautiful Platinum Decoration
5. 2-Heat Electric Units [Hi-Low]
6. Formed [No-Spatter] Pouring Lip
7. Easy Grip Handles
8. Heat-resisting Glass by CORNING

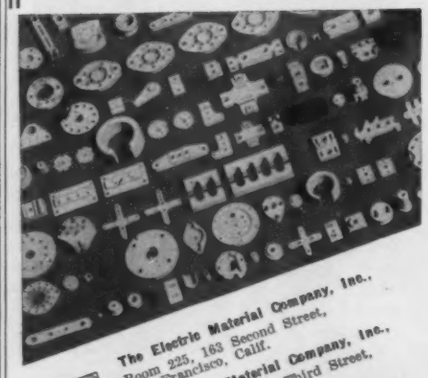
You get all this value at the one price in one complete package. No "extras" to buy. Insist on the CORY. Latest catalog showing all models gladly mailed.

GLASS COFFEE BREWER CORP.
325 North Wells Street Chicago, Illinois

Specify CERAMIC INSULATION

★ IN 36 YEARS, we have developed an enviable technique in manufacturing ceramics.

Our Research Laboratory has recently developed several new and outstanding materials, both as to heat and electrical characteristics, which take up and carry on where porcelain stops. Why not consult our representatives, shown below? Samples and literature are available upon request.



The Electric Material Company, Inc., Room 225, 163 Second Street, San Francisco, Calif.
The Electric Material Company, Inc., Room 328, 912 East Third Street, Los Angeles, Calif.

American Lava Corporation
Chattanooga, Tenn.
Sales Offices in Principal Cities

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IN ELECTRICAL APPLIANCES IT'S Sunbeam

★ Automatic MIXMASTER ★ Double-Automatic IRONMASTER ★ Silent AUTOMATIC TOASTER ★ COFFEEMASTER ★ WETPROOF HEATING PAD ★ MASTER CORD and PLUG SET ★ GLASS COFFEE MAKERS FANHEATER ★ FLAT TOASTER ★ Automatic CLOTHES SPRAYER.

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5600 West Roosevelt Road, Chicago, Ill.
316 Commercial St., Los Angeles, Cal.
921 11th Ave. N., Seattle, Wash.
224 S. W. Temple St., Salt Lake City, Utah
47 YEARS MAKING QUALITY PRODUCTS

H. J. Mayo Named Head of Southern California IES

H. J. Mayo, Smoot-Holman Co., Inglewood, Calif., has been elected chairman of the Southern California Section, Illuminating Engineering Society. F. K. Sampson, Southern California Edison Co., is secretary.

Board of managers includes L. A. Gates, Los Angeles Bureau of Power & Light, past chairman; W. T. German, Edison Company; Frank A. Hansen, Western Institute of Light & Vision; H. D. May, Jr., General Electric Co., and Alston Rodgers, General Electric Co. May is IES prize award judge.

●

NANCY FINCH, Utah Power & Light Co. home service directors, was guest editor of *McCall's Magazine* in the preparation of an article in the September issue on home laundries.

●

F. H. DOREMUS, connected with General Electric Co.'s industrial department, Denver, since 1925, has been appointed manager of the department in the Rocky Mountain district. He succeeds Henry C. Glaze, an employee of G.E. for 39 years, whose voluntary retirement under the company pension plan became effective Aug. 1.

●

GEORGE MUIR, assistant in B. C. Electric Railway Co.'s information and complaint bureau, has been transferred to the light and power department. He is succeeded by T. Marshall.

●

CHARLES DAVIES has been appointed superintendent of credit and collections for San Diego Consolidated Gas & Electric Co. He succeeds the late A. R. Foster.

●

WILLIAM H. GORMAN, former assistant director of the transportation department of the California Railroad Commission, San Francisco, has been named director of the commission's southern district with offices in Los Angeles. He succeeds James E. McCaffery, who resigned last month.

●

R. J. MCCABE, former New England district manager of Graybar Electric Co., has been appointed manager of sales of electrical materials for Indiana Steel & Wire Co.

●

WALTER SPENCER, Spencer Electric Co., San Francisco and Oakland, and George Abbett, Abbett Electric Co., San Francisco, have been elected president and vice-president respectively of the San Francisco Electrical Contractors' Assn. They succeed Kenneth Ryals and Louis Douat, both of whom resigned in order to give more time to their businesses.

GEORGE F. BRAYER, San Francisco, has been appointed to fill the vacancy on the board of directors of the San Francisco Electric Contractors' Assn. The vacancy is the result of the resignation of the vice-president and president and the election of a former board member as new president.

●

FREDERICK H. MACGOWAN, formerly connected with Graybar Electric Co., San Francisco, has been appointed chief of electrical exhibits for the Golden Gate International Exposition. He succeeds Arthur H. Halloran, who recently resigned.

●

AL PURDUE, formerly connected with Pacific Gas and Electric Co.'s San Jose office, has been named lighting specialist for Westinghouse Electric & Supply Co., San Francisco. He succeeds the late Harry Wellman.

●

WALTER GRAHAM has been added to the San Diego city electrical inspection force. Evan Shaffer has been given special work in the tracing of radio interference.

●

WILLIS F. DUNBAR has been appointed traveling field representative of Bryant Electric Co., San Francisco. He covers the district from San Francisco to Bakersfield and from Reno to Salt Lake City.

●

EARL NEWELL, Yakima (Wash.) Hardware Co., was Western division winner of a trip offered by Bendix Home Appliance, Inc., to the first dealer salesman in each division to sell ten Bendix home laundries. Because of illness, however, Newell was unable to make the trip. Vince Runyon, Benedict-Gingrich Co., Pasadena, Calif., second prize winner, was awarded the trip instead.

●

ALDEN H. BINGHAM, San Joaquin Light & Power Corp.'s superintendent of building operation and maintenance, has retired. He joined the company in 1920.

●

GEORGE DICK, for the past five years with Lipman Wolfe, Portland department store, has joined the appliance department of Roberts Bros.

●

DR. ROYAL W. SORENSEN, head of California Institute of Technology's electrical engineering department, has been named chairman of the student branch committee of the American Institute of Electrical Engineers. In this capacity he will be expected to keep in touch with about 150 student branches of the AIEE throughout the country.

Deaths

J. D. HERTZ, 37, member of Pacific Power & Light Co.'s engineering department at Walla Walla, Wash., died in that city. While an electrical engineering student at Oregon State College, he spent his summer vacations as plant operator and clerk for the company. Upon graduation in 1928 he became a permanent member of the company. His principal work was in the improvement of carrier current telephone communication on the system.

●

JEAN D. ROBERTS, for fifteen years an employee of Tucson (Ariz.) Gas, Electric Light & Power Co. and for ten years home demonstrator for the company, died in San Diego July 23.

●

CHARLES A. EATON, 70, retired electrical engineer, died at his home in Seattle. He had been engaged in various phases of electrical work in the Northwest for more than 50 years.

●

Speakers

Dr. Adam S. Bennion, assistant to the president, Utah Power & Light Co.: "The Romance of Business"—at the North Central States Managerial Conference of Utility Men, Duluth, Minn. Also before the Montana Bankers' Assn., Helena; Minnesota Bankers' Assn., Minneapolis; the Rotary Club, Wichita, Kans. He will speak at the American Bankers' Assn. convention in Houston, Tex., in November.

At the Fourth annual Western Safety Conference, Los Angeles, Sept. 13—Al Pryor, Southern California Edison Co.; M. Culverwell, Los Angeles Bureau of Power & Light, and J. T. Shepard, Los Angeles Bureau of Power & Light: "Highway Illumination Through Urban Centers." William Lauer, Lighting Engineer, City of Los Angeles: "Illumination." Ralph Wiley, city electrician, San Francisco, and George M. Bowman, electrical engineer, Fresno, Calif.: "Uniformity of Traffic Signals."

F. J. Kurth, vice-president, Anemostate Corp. of America, New York—before San Francisco Air Conditioning Society.

TRADE NOTES

D. E. SANFORD Co., San Francisco, has been appointed representative for Universal Cooler Corp. in California, Nevada, Arizona, New Mexico and Hawaii; representative for Albany Sale Co.'s line of Handy plugs in the eleven Western states and Hawaii, and representative for Waring Mixer Corp.'s Waring-Go-Round in the eleven states and Hawaii. J. Alberton, formerly division manager for Universal Cooler, is now part of the Sanford organization.

●

APPLIANCE STORES have been opened in the General Department Stores of Preston and Logan, Utah, by J. L. Naylor and P. G. Graham.

●

LANDERS, FRARY & CLARK has opened an enlarged office and showroom on the fourth floor of the Western Merchandise Mart, San Francisco. Featured is a complete display of the company's new fall lines.

●

SIXTH AVENUE APPLIANCE Co., Tacoma, Wash., has been incorporated by R. Jensen, Harvey L. Robertson and Thor C. Tollefson. The firm will specialize in household electrical equipment.

RUPER APPLIANCE Co. is a new store in Provo, Utah. John H. Rupper is manager.

●

DORIS-HEYMAN FURNITURE Co., Denver, has installed a modern kitchen and enlarged its floor and table lamp displays. The improvements are part of a complete modernization program.

●

COLONIAL HEIGHTS RADIO SERVICE, Portland appliance store has taken on the Kelvinator line of major appliances.

ELECTRICAL TESTING LABORATORIES

Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.

80th St. and East End Ave., New York

★ *For Quick Service on Quality Products from Local Stocks*

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PYREX INSULATORS
BREWER-TITCHENER HARDWARE
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FUSES, CUTOUTS, DISCONNECTS, PROTECTIVE DEVICES
Schweitzer & Conrad, Inc.
CAPACITORS
Cornell-Dubilier Corp.
World's Largest Exclusive Mfgrs. of Capacitors
TRANSFORMERS
Gardner Electric Mfg. Co.
Power and Distribution Transformers
Lee Skipwith & Co., Inc.
Niagara Air-Insulated Current Transformers
CABLE GRIPS
Kellems Products, Inc.
CONNECTORS, GROUND ROD CLAMPS, UTILITY HOISTS
Jasper Blackburn Products Corp.
GROUND LINE POLE TREATMENT
Osmose Corp. of America
METERING INSTRUMENTS
Landis & Gyr., Inc.
CROMPTON TONG TEST AMMETER
Columbia Electric Mfg. Co.
UNDERGROUND TOOLS & EQUIPMENT
T. J. Cope, Incorporated
TREE TRIMMING EQUIPMENT
Bartlett Manufacturing Co.
FRICTION AND RUBBER TAPES
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SAN FRANCISCO

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NICHROME wire and ribbon in all sizes.

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Likewise NICHROME V, the longer-life alloy.

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Other D-H alloys for resistance purposes.

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Alloy castings and wrought pieces on special order.

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• A truly representative stock of high nickel content alloys in various shapes and sizes, particularly NICHROME (Reg. U. S. Pat. off.) is now available to the Western trade.

• So bear this local warehouse in mind.

DRIVER-HARRIS CO., HARRISON, N. J.

NICHROME

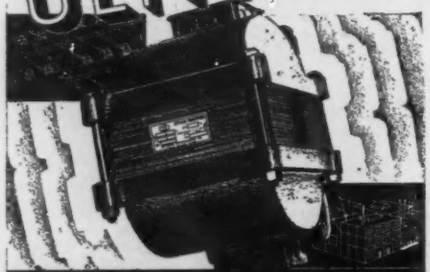
Crapo
GALVANIZED PRODUCTS
STEEL STRAND
Telephone and Telegraph Wire

Crapo Galvanized Wire and Steel Strand can be spliced and served without injury to the heavy, protective zinc coating. The perfect adhesion of this tough, ductile coating to the wire enables it to withstand sharp bending and twisting, produces corrosion-resisting joints, makes for longer life, lower maintenance costs.

Crapo Galvanized Seven-wire Steel Strand and Telephone Wire are readily available in all standard grades and sizes from representative Supply Jobbers.

INDIANA STEEL & WIRE CO.
MUNCIE, • INDIANA

JEFFRIES



TRANSFORMERS

Save Their Cost and Pay Dividends by—

1. Elimination of duplicate conduit runs.
2. Saving in power rate.

(Put all of your 110-volt equipment on a 220-volt or 440-volt power circuit, it is economical.)

JEFFRIES TRANSFORMER COMPANY
5706 Long Beach Ave. Los Angeles

STEVENS SALES Co., Salt Lake City, has been appointed agent for Tork Clock Co. in Utah and southern Idaho.

●

CALIFORNIA ELECTRIC WORKS, San Diego, has taken over the United Motor Service repair and rebuilding of small motors, particularly for refrigeration and appliances.

●

COOLMASTER DISTRIBUTING Co. has opened an office in Salt Lake City to handle distribution of a new room cooler in Utah and Idaho. B. L. Williams is manager.

●

WEIMER HARDWARE & APPLIANCE Co., Portland, has remodeled its store and installed an all-electric kitchen.

●

DIVISION HARDWARE STORE, Portland, has taken on the Hotpoint water heater line.

●

SELLWOOD ELECTRIC & HARDWARE, Portland, has moved to 6812 SE. Milwaukee.

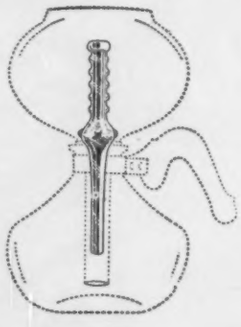
●

PROVO (UTAH) MAYTAG Co. is a new and complete appliance store opened by Archie D. White.

NEW PRODUCTS

Glass Filter Rod

All-glass filter rod for use with glass coffee makers of the vacuum type is being manufactured by Glass Coffee Brewer Corp. The rod fits the upper glass or funnel of most



existing glass coffee makers and is said to make good coffee without the need of cloth, paper, springs or hooks in connection with the filter. The rod makes all coffee makers equally useful for brewing tea. Retail price is 50c.

●

Automatic Voltage Stabilizer

Voltage regulators manufactured by Raytheon Mfg. Co. are said to correct permanently the varying voltage conditions generally encountered and provide the constant a. c. voltage essential for the effective operation of many electrical devices. The regulator automatically stabilizes an a. c. voltage that may be varying from 95 to 130 volts and holds it constant at 115 volts plus or minus 1 per cent. It is a magnetic device without moving parts or adjustments and can be made to operate from any commercial a. c. power source and deliver one or more required voltages with power outputs up to several thousand volt-amperes.

●

Snake-Bite Kit

For linemen and other electrical workers in snake-infested territory, Cutter Laboratories offers a new kind of snake-bite kit called "Compak." The kit, devised by a physician-sportsman, replaces such old-fashioned and

inadequate remedies as potassium permanganate, kerosene, etc., and, when properly applied, is said to reduce mortality to less than 2 per cent. It consists of a small knife, tourniquet, iodine tube and two rubber suction cups which serve as the carrying kit. When bitten, lineman applies tourniquet above wound; crushes iodine tube on bite; cuts each fang mark; then moistens skin around wound and edges of suction cup (large one where possible; small one for fingers, shins, etc.), squeezes out all air possible and applies over cut. This draws out venom. Entire kit is the size of a finger.

●

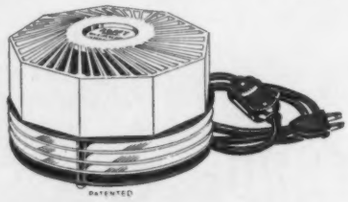
Oil-Resisting Cord

Oil-resisting portable cord which is also proof against grease, acids, alkilis, etc., has been announced by General Electric. The new cord has a tough jacket containing no rubber. It is mold-cured in lead directly over the core and is given a waxed finish. The jacket is both dense and tough, making, G. E. says, the cord durable and resistant to mechanical as well as chemical injury. The core has extra flexible copper conductors, cotton-wrapped and insulated with 30 per cent rubber.

●

Indirect Air Circulator

Draftless air circulation is said to be available in a room through use of Roffy Mfg. Co.'s new indirect air circulator. The unit, 7½x7½x5 in., draws cool air in at floor level,



projects it in a perpendicular column upward as high as 15 ft. Operating at approximately 1/6c per hour, the fan moves 300 cu. ft. of air per minute. It employs a low-speed, noiseless motor with a 4-blade fan and sealed-in-oil reservoir and thrust bearings. Safety is assured by enclosed construction. In addition to cooling a room, the unit can also be used at any time of the year to disperse layers of heat, cold, smoke and odors.

Recessed Kitchen Fixture

Recessed fixture with 6½ in. square Holophane control lens is designed by DayBrite Lighting, Inc., for use in kitchens, dressing rooms, etc. Fixture consists of a roughing box of galvanized steel with sprayed aluminum interior and is designed for only one 100-watt lamp. Box has ½-in. K.O.'s at top and each side at socket location.

●

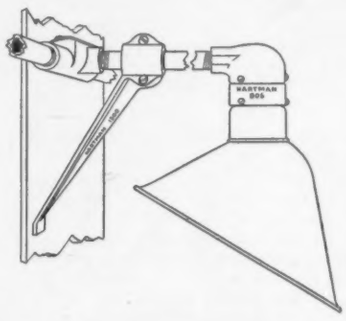
Apartment House Range

For modern apartments, small kitchens and large building projects Edison General Electric Appliance Co. has designed the new Milford range. Only 19½ in. wide, the range has one Calrod surface unit with five speeds; two surface units with three speeds; one 3,000-watt oven unit.

●

Conduit-Supporting Bracket

Bracket designed to support conduits extending out from walls in the lighting of buildings, sign-boards, etc., is being manufac-



tured by B. Hartman. Heavy end of the bracket clamps round the conduit (see illustration); light end rests against the wall. Sliding the bracket on the conduit one way or the other will either raise or lower the conduit, thus giving the proper angle to the light.

●

Table Broiler-Griddle

Reversible heating element is the main talking point of National Enameling & Stamping Co.'s new electric table broiler-griddle for frying bacon and eggs, broiling steaks, griddling wheat cakes, toasting sandwiches, baking biscuits, etc. The heating element is so made that it can be placed below the griddle for frying or in the cover in a true broiling position. Air circulation round the element in the broiling position is said to be such as to do away with smoking or spattering of grease. Another talking point of the device is the cast aluminum platter which can be used for frying and griddle-cooking. Detachable walnut handles enable cook to serve platter right at table while meat is still sizzling. Retail price is $9.95.

●

Electric Soldering Tool

New electric soldering tool designed especially for light, delicate work has been introduced by Ideal Commutator Dresser Co. Called the Handy, the tool is only slightly larger than a pencil and can therefore be used in reaching down through intricate mazes of wire and parts. The iron consists of a handle with two heating carbons, one fixed, the other movable against a spring. When both carbons contact metal, an electric circuit is closed and the metal reaches soldering temperature almost instantly. This heat is concentrated and controlled in a small area. One movable carbon is said to make soldering on uneven surfaces easy. The tool draws current only when in actual use.

Variable Speed Transmission

New, inexpensive and using only standard V-belts is Ideal Commutator Dresser Co.'s Select-O-Speed transmission, which, says the manufacturer, gives an infinite selection of speeds over a 5 to 1 or greater ratio by a simple movement of a control lever. Applicable to old and new machinery, the transmission comes in sizes up to 7½ hp. It can be mounted in any place or position. Variation of the speed ratio is made possible by an arrangement of two interlocking sheaves.

●

Starting & Braking Control

Recent development for motor control is a new three breaker combination containing forward, reverse and braking oil circuit breakers announced by Westinghouse. Each breaker is electrically operated with an independent solenoid mechanism. Forward and reverse breakers are arranged to close their contacts when the solenoid is energized, while the braking breaker contacts are opened when the solenoid is energized. Brake contacts are spring closed when mechanism is tripped. All three breakers are both electrically and mechanically interlocked. Breakers are 25,000 kva. rupturing capacity. 7,500 volts, 600 amp., with silver to silver contacts, "De-ion" interrupters, Micarta bushings and enclosed construction. Time for energizing the trip coil on either forward or reverse breakers until the brake makes contact is .125 sec.

●

Synchronous Motor Unit

A new synchronous motor unit is being offered by Electric Machinery Mfg. Co. It is most advantageous on smaller industrial reciprocating compressors requiring down to 40 hp. It features a V-belt driven exciter mounted on top of the synchronous motor to save floor space, and an automatic, enclosed wall-mounted control instead of the usual panel-mounted starter.

●

Radio-Interference-Proof Insulators

Now available to public utilities constructing new and rebuilding old lines are radio-interference-proof insulators priced the same as ordinary insulators. This development is the result of Westinghouse Electric & Mfg. Co.'s installation in its two porcelain plants of a new copper-oxide glaze and simplified processing method for making all insulators manufactured free from radio interference.

●

Air Conditioner

Philco Radio & Television Corp. has invaded the air conditioning field with a new, complete unit known as the Cool-Wave. Built by the York Ice Machinery Co., for Philco, the unit occupies only a little more than 4 sq. ft. of space, has finger-tip controls, requires only one electrical connection and no water supply piping.

NEW BOOKS

ARTIFICAL LIGHT AND ITS APPLICATIONS, revised edition, 258 pages, published by Westinghouse Electric & Mfg Co., 75c. The book, with nineteen chapters, covers: light sources, the language of lighting, photometry, light and vision, color, light control, interior lighting design, industrial lighting, school lighting, commercial and public building lighting, display lighting, home and farm lighting, floodlighting, recreational and sports lighting, architectural lighting, electrical advertising, street and highway lighting, theater lighting.

"I WANT A RANGE WITH CHROMALOX UNITS"

is heard more and more often wherever electric ranges are sold. Dealers and utilities are meeting this demand—and in so doing, cutting down servicing costs, improving customer relationship, building business. These units are right for replacement, too — they fit all ranges.

CHROMALOX

Super-Speed **RANGE UNITS**

REPRESENTED by

MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash.
1501 N. W. Kearny St., Portland, Ore.
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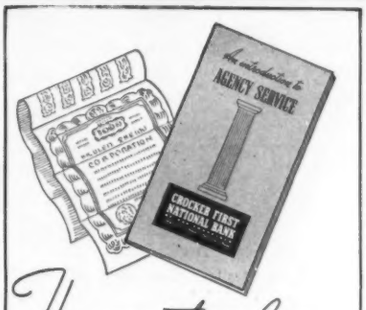
912 E. Third St., Los Angeles, Calif.

THE PETERSON COMPANY
1921 Blake St., Denver, Colo.

EDWIN L. WIEGAND CO.
7540 Thomas Blvd., Pittsburgh, Pa.



The practical way

TO HANDLE SECURITIES

With an Agency Account you retain complete authority over your holdings, but we relieve you of all time-consuming and irksome details. A simple letter of instructions is the only authorization needed to open an account. On request we shall be glad to send you our interesting booklet, *An Introduction to Agency Service*.

Ask for Booklet M-3

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank

PROCEEDINGS OF THE NATIONAL ASSOCIATION OF RAILROADS & UTILITIES COMMISSIONERS for 1937, published by the State Law Reporting Co., New York, $6. The volume includes discussions by specialists on regulation as applied to: rates, rural electrification, the Public Utility Holding Company act, securities issues, problems presented by the Federal Motor Carriers act, accounting practices.

●

PROCEDURE HANDBOOK OF ARC WELDING DESIGN AND PRACTICE, fifth edition, 1,212 pages, 1,243 illustrations, published by the Lincoln Electric Co., $1.50. Reissued annually, the handbook is intended for all those connected with welding from designers to operators. It is divided into eight parts as follows: I, Welding Methods and Equipment; II, Technique of Welding; III, Procedures in Speeds and Costs for Welding Steel; IV, Structure and Property; V, Weldability of Metal; VI, Designing Steel Machinery; VII, Designing Structures; VIII, Typical Applications in Manufacturing Construction and Maintenance.

PRODUCT DATA

☆ To help you find better, more complete information about various phases of your work, ELECTRICAL WEST this month overhauls its Product Data column. No longer will this column contain three-line notices heralding the advent of eighteen or twenty manufacturers' bulletins. Instead it will give you a few longer, more detailed reviews of bulletins selected extra carefully in order to assure their value to you. . . Use them. They're free. They point your way to greater profits . . . Simply address a postcard to ELECTRICAL WEST and ask for the desired bulletin by number. We'll move heaven and earth to get it to you quickly.

901:

ENCLOSED SAFETY SWITCHES, employing positive pressure fuse clamps which help to reduce fuse heating, and other electrical equipment is cataloged by Mongerson's Electrical Machine Works. Engineering data in separate section in back of book supplies electrical contractors with sufficient information to make a layout for almost any ordinary engineering or lighting job.

902:

"RECOMMENDATIONS FOR OFFICE LIGHTING" is title of an illustrated booklet designed to sell office workers on the value of good lighting and to help contractors point out best installations. Lighting equipment featured is F. W. Wakefield Brass Co.'s Commodore series.

903:

SINGLE-CIRCUIT SUBSTATION UNIT is fully described and illustrated in General Electric's publication, GEA-2840. This unit is a standard 3-phase transformer arranged for changing taps under load and equipped with lightning arrestors and a standard low-voltage circuit breaker with its control relays and potential and current transformers. G.E. says the equipment, assembled as a unit, affords substantial savings in installations and operating expense.

904:

"NOTES ON FAULT LOCATION IN CABLES" is a 52-page, pocket-size notebook published by Leeds & Northrup Co. as a sequel to one published ten years ago. Illustrated with diagrams, it explains methods for identifying faulty wires in a cable, for measuring conductor resistance, for locating grounds and crosses by Murray and Varley Loop tests, for locating opens by capacitance tests.

905:

TYPE U DE-ION CIRCUIT BREAKERS, designed for indoor service, especially in generating and industrial plants, are described at length in a 12-page, illustrated booklet by Westinghouse. The breakers are applicable to standard voltage ratings from 2,500 to 15,000 volts. They are available in one-, two-, three- and four-pole arrangements with mechanically and electrically trip-free solenoid operating mechanism, and may be applied on 25, 60 cycles or other commercial frequencies.

906:

FIELD EXPERIENCE and testing for fifteen years, says Pacific Electric Mfg. Corp., proves motor control of Type RWE oil circuit breakers more reliable than solenoid control. You save money on low first cost, the company says, have quick, safe interruptions and fast closing. Descriptions and illustrations tell an interesting story.

907:

"LUBRICATION" is the name of a monthly technical magazine published by the Texas Co. and devoted to the selection and use of lubricants. The July issue, for example, tells about the selecting of lubricants for air conditioning and electric refrigeration machinery. Text is open-minded technical, readable.

908:

HIGH-VOLTAGE AIR SWITCHGEAR as manufactured by I-T-E Circuit Breaker Co. is concisely described in a new 8-page bulletin which announces the extension of the line to include circuit breakers for service on 2,500-5,000-volt circuits. Covered are interrupting and load-handling members of the switchgear, manual control, interlocking, main disconnects, ratings and dimensions, accessibility, immersion in air, contactor characteristics and interrupting capacity.

909:

STRIKING LAYOUT and color add to the interest of Allis-Chalmers' bulletin covering horizontal drawout metal-clad oil circuit breaker equipment for power stations, substations and general industrial purposes. All facts about the equipment are listed under descriptive heads: "Expulsion Port and Ruptor Principle of Arc Interruption," "Operating Mechanisms," etc. Allis claims the equipment's superiority is proved by its safety reliability, small space requirement, rugged construction, minimum installation expense, practically no maintenance, accessibility and convenience and uniformity.

910:

MADE TO BE INSERTED in a loose-leaf notebook is Roller-Smith's catalog on rotary switches for instrument and control use. Going straight to the point, the booklet describes use, construction and operation of the devices. Four pages in back of book give diagrams of connections and switch developments.

911:

PRIMARILY A CONSUMER BOOKLET but also of value to the dealer is Westinghouse's new kitchen planning booklet, "As Simple as 1-2-3." This colorful book both illustrates the planned electric kitchen and introduces a new sales slant of appealing to the customer by selling her separate kitchen centers. By dividing the kitchen into its accepted arrangement of the refrigeration and preparation center, the range and serving center, and the sink and dishwashing center, the dealer is shown how he can make a complete electric kitchen presentation by the sale of individual centers.

912:

IN 1936 GENERAL ELECTRIC introduced pyranol distribution pole-type capacitors specifically designed for feeder application. These equipments were available in ratings 30 to 180 kva. To enable more effective distribution of the corrective kva., however, there was needed a supplementary line of smaller pole-type units. Now being made, these are fully described in a booklet, GEA-2561D. Known as Class ID, the capacitors are offered for primary circuits, 2,300 to 13,200 volts, and for secondary circuits, 208 to 575 volts.

913:

WARD LEONARD ELECTRIC CO. has issued a bulletin giving complete information about its new heavy-duty midget relay. These relays are furnished with extra large silver-to-silver contacts to provide a maximum contact rating of 10 amp. up to 125 volts a.c., 10 amp. up to 22 volts d.c. or 2 amp. from 23 to 125 volts d.c. They are available only with single pole, double break, normally open contacts.

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General Elec. Supply Corp.
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● INDEX TO ADVERTISERS

SEPTEMBER, 1938

American Lava Corp. 62
Brewer-Titchener Corp. 19
California Oregon Power Co. 34, 35
Chicago Flexible Shaft Co. 62
Crocker First National Bank 65
Driver-Harris Co. 63
Edison General Elec. Appliance Co., Inc. 10, 11
Electrical Testing Labs. 63
G. C. A. Mfg. Co. 67
General Electric Co. 6, 20
Glass Coffee Brewer Corp. 61
Graybar Electric Co. 4
Hazard Ins. Wire Works 8
Honn Co., Geo. E. 63
Idaho Power Co. 34, 35
Indiana Steel & Wire Co. 64
International Nickel Co., Inc., The 5
Jeffries Transformer Co. 64
Kearney Corp., James R. 9
Klein & Sons, M. 60
Lapp Insulator Co., Inc. 14
Lincoln Meter Co. 15
Locke Insulator Corp. 18
Montana Power Company, The 34, 35
Noblitt-Sparks Industries, Inc. 13
Okonite Company, The 8
Okonite-Callender Cable Co., Inc. 8
Pacific Coast Electrical Bureau ..... Back Cover
Pacific Gas and Electric Co. ..... Inside Back Cover
Pacific Power & Light Co. 34, 35
Portland General Electric Co. 34, 35
Puget Sound Power & Light Co. 34, 35
Rocky Mountain Electrical League 34, 35
Schweitzer & Conrad, Inc. 57
Silex Company, The 7
Southern California Edison Co. Ltd. ..... Inside Front Cover
Square D Company 59
Sterling Reflector Co. 61
Tork Clock Co., Inc., The 68
Utah Power & Light Co. 34, 35
Utility Electric Co. 58
Walker Brothers 55
Washington Water Power Co. 34, 35
Westinghouse Electric & Mfg. Co. 2, 12, 16, 17
Wiegand Co., Edwin L. 65
Youngstown Sheet & Tube Co. 3

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

COMMANDS MORE SERVANTS THAN ALADDIN'S LAMP

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

SEPTEMBER

COORDINATED INDUSTRY CAMPAIGN ON "LIGHT CONDITIONING"

THE EVENT this month is a campaign on Mazda lamps. In collaboration with a lamp manufacturer who has undertaken to train dealer salespeople how to specify proper size lamps, the P. G. and E. is advertising "light conditioning"—the right lamp in the right place. Readers will be directed as usual to "see your dealer".

The company is also supplying printed cards to show that P. G .and E.'s extremely low electric rates make it possible to enjoy better lighting without even thinking of the cost. These cards will be available through any P. G. and E. office after September 15.

See our office today and learn the details of this unusual sales promotion. Get a line on our advertising and learn how easily you can make it work for you.

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

EW 109-938

America's greatest industry—the home

—ranks lowest in use of electricity

Homemaking—the mere process of daily living—is America's biggest industry by far. All told, something like 30 billion dollars pass through the housewife's hands annually. Yet this great industry, consuming more than half of our national income, ranks lowest in the use of electricity.

Electrification of other industries, according to government census, ranges from a minimum of 56% in forest products to 98% in printing and publishing. Compare this with the following. In the 31 million homes in the United States,

10 million have no electric lights and no hand irons

20 million have no washer, no vacuum cleaner and no toaster

24 million have no electric refrigerator

28 million have no electric range

29 million have no electric water heater

It is safe to say that in spite of the tremendous progress in recent years, the American home is still less than 10% electrified.

America's biggest industry still represents our biggest electrical market.

Pacific Coast Electrical Bureau

601 WEST 5TH STREET, LOS ANGELES • 447 SUTTER STREET, SAN FRANCISCO